FLORA OF HARDOI

ABSTRACT

THESIS
SUBMITTED FOR THE DEGREE OF
Doctor of Philosophy
IN
BOTANY

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DEPARTMENT OF BOTANY
ALIGARH MUSLIM UNIVERSITY
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Present thesis embodies the results of systematic studies with special reference to medicinal plants, carried out over a period of five years, on angiospermic flora of Hardoi District (tehsil). This tehsil, situated between 26° 53' and 27° 47' North and 79° 41' and 80° 49' East, is stretched over an area of 6012 Sq. Kms. It is one of the four tehsils which constitute Hardoi district of Central U.P.

The entire thesis runs into 11 Chapters, *viz.* (1) Introduction, (2) Hardoi tehsil, (3) Climate, (4) Plan of work and present study, (5) Vegetational composition, (6) Vegetation of special habitat, (7) Factors affecting vegetation, (8) Analysis of vegetation, (9) Summary, (10) Systematic treatment of flora and (11) Selected bibliography.

First 9 Chapters are general and deal with a brief discussion of relevant aspects pertaining to the area under study. Maps and graphical figures have been incorporated in second and third Chapters to illustrate the geographical position and climate of the tehsil. Eigth Chapter deals with a simple statistical analysis of entire flora. Analysis has been done from various angles. This will help to perceive a picture of composition of vegetation in terms of percentage contribution of different major and minor taxonomic groups.

Systematic portion starts with a comprehensive analytical synopsis of the families. Attempt has been made to cover as many

variation as possible to make the task of assigning a plant to its correct family less combersome.

The families have been arranged in accordance with the system of Bentham and Hooker. But, as far as the circumscription of families is concerned, modern concepts have been followed. Each family, having more than one genus except most of the cultivated ones, start with a dentated key to genera. This is followed by treatment of individual genus and species. Where a genus is represented by more than one species, a key to the species has been incorporated. The keys are based on easily visible morphological and field characters. For each species the correct name has been given first, followed by basionym, if any, and other synonyms. A short description is given in each case to ascertain the identity. At few places, notes on distinguishing characters have been given. The medicinal utility of plants, if any, with useful plant parts and disease in which the drugs are used, also given. Flowering and fruiting period, followed by local name only in the case of medicinal species, place of collection and field book numbers have been indicated for each species, except most of the cultivated species.

In all, 742 species belonging to 515 genera spread over 127 families have been treated systematically. A brief resume of vegetation is given at the end of this chapter under the headings "Vegetation at a glance".

VEGETATION AT A GLANCE

A. TAXONOMICAL ANALYSIS:

S. No.	TAXA	DICOT	MONOCOT	TOTAL
1.	Families	101	26	127
2.	Genera	415	100	515
3.	Species	600	142	742

Genus Species ratio : 1:1.44

Monocot-Dicot ratio : 1:3.88

Number of families with 1 genus : 59

Number of families with 2-5 genera : 43

Number of families with 6-10 genera : 18

Number of families with 11-15 genera : 3

Number of families with more than 16 genera : 4

Number of genera with 1 species : 398

Number of genera with 2-5 species : 108

Number of genera with 6-10 species : 7

Number of genera with above 10 species : 2

B. HABIT-WISE ANALYSIS:

S. No.	HABIT	DICOT	MONOCOT	TOTAL	% of TOTAL FLORA
1.	Herbs	336	128	464	62.53
2.	Shrubs	94	4	98	13.21
3.	Trees	119	4	123	16.58
4.	Climbers	51	6	57	7.68

C. MEDICINAL PLANT ANALYSIS:

DICOT	MONOCOT	TOTAL	% of TOTAL FLORA
169	12	181	32.26

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ALIGARH MUSLIM UNIVERSITY — ALIGARH

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India

Date. 27th Feb. 1991

CERTIFICATE

This is to certify that the thesis entitled, "Flora of Hardoi" embodies original and bonafide work carried out under my supervision by Mr. M. Badruzzaman Siddiqui and that no part of this thesis has been submitted for any other degree or diploma.

(Wazahat Husain)
Supervisor

Dedicated

to my Parents

ACKNOWLEDGEMENTS

I kneel before Almighty Allah to thank Him for His providence, benediction and benevolence and importune Him to bless this humble slave in future.

It is matter of pleasure and pride for me to accord my most sincere thanks to my supervisor Dr. Wazahat Husain, Professor, Botany Department, Aligarh Muslim University, Aligarh, for suggesting the problem and skilfull supervision. An accomplished taxonomist and a great teacher, I have never found him lacking in novel ideas.

I also submit my humble regards and sincere thanks to my brothers, sisters, bhabhi and particularly my parents, deserve a special mention since they made me curious about the green world. They have always given me encouragement and morale support needed during such a work. My younger brother, Raja and sister, Malka, deserve a special word of thanks for every possible assistence they have provided me.

Among my friends I am specially appreciative to Mr. M. Akhtar, Dr. Samiullah Khan and Mr. Imran Khan for altruistic cooperation. They have gone through the manuscript quite painstakingly in order to minimize the errors.

I am thankful to my senior colleague Dr. Ather Ali Khan, Lecturer, Botany Department, G. F. College, Shahjahanpur. Thanks are also due to M/s. Zaki A. Siddiqui, S. Baqar Imam Zaidi, Abul Fazal, Dr. Mujeebur Rahman Khan, Noor Ashraf, Dr. Haroon

Rasheed Khan and Mazahir Husain for maintaining an atmosphere conducive to research. Thanks are also due to Mr. M.Z. Khan for expert word processing.

I am also thankful to Profs. A.K.M. Ghouse, Chairman, and Khalid Mahmood, ex-chairman, Department of Botany, Aligarh Muslim University, Aligarh, for providing various facilities.

Thanks are also due to Dr. R.B. Ghose, Deputy Director and Nihal Aziz, scientist, Central National Herbarium, Calcutta, for their kind help during my visit to the Institution.

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(M. Badruzzaman Siddiqui)

ABBREVIATIONS OF TITLES OF SOME IMPORTANT BOOKS

FBI.	Flora of British India by J.D. Hooker (1872-97).
Fl. Delhi	Flora of Delhi by J.K. Maheshwari (1963).
FPP.	Flora of Punjab Plains by N.C. Nair (1978).
FUGP.	Flora of Upper Gangetic Plain and of the Adjacent Siwalik and Sub-Himalayan Tracts by J.F. Duthie vol. I & II (Reprinted edition 196Ø).
GBCIP.	Grasses of Burma Ceylon India and Pakistan by N.L. Bor (196Ø).
HFDD.	Herbaceous Flora of Dehradun by C.R. Babu (1977).
Suppl. FUGP.	Supplement to Duthie's Flora of the Upper Gangetic Plain and of the Adjacent Siwalik and Sub-Himalayan Tracts by M.B. Raizada (1976).

CONTENTS

INTRODUCTION

The flora of India is more varied than that of many other countries of an equal area in the Eastern hemisphere, if not in the globe (**Hooker, 1904**). This is because of varied rainfall, temperature, geology and topography, which influence the floristics and vegetation differently in various regions. A comprehensive and up-to-date flora is an essential tool for the study of plants of any area and to assess their utility.

In India, systematic botany has been distinct phases of its rise and decline. Even before the inception of **Botanical Survey of India**, (BSI) in the year 1890, active botanization of the country was initiated by a host European botanists. This phase lasted upto 1937 when BSI was virtually abolished and the botanical activities went intc the arms of **Morpheus**. The year 1954 will be remembered as a land mark in the history of Indian Botany. It was in this year that BSI was resurrected, and thus, started a new era of organised botanical activities, the veins being in the hands of new ardent and fervent botanists. The post independence liturature of taxonomy bespeaks the amazing pace at which the scientists from BSI and various universities combat different area and produced the liturature of high quality. Not only the general survey but monographic studies also started quite early, *e.g.* "The genus *Phoenix* Linn. in India" (**Mahabale & Parthasarthy, 1963**), "The genus *Typha* Linn. in India" (**Saha, 1968**), "The genus *Panicum* Linn. in India" (**Majumdar, 1973**), "The genus *Adenostemma* J.R.G. Forst. in the Indian region" (**Panigrahi,**

1975), "The genus *Zanthoxylum* Linn. in India" (**Babu,** 1974), "Revision of genus *Scilla* in India" (**Deb & Dasgupta,** 1978), "A taxonomic revision of Indo-Burmese *Trichodesma* R. Br." (**Benerjee *et al*,** 1978), "Taxonomy of bamboos" (**Bahadur,** 1979), "A note on the *Terminalia tomentosa* complex" (**Bahadur & Gaur,** 1980) etc. Biosystematists soon followed the same suit.

Evolution is an unceasing process ending taxa keep on emerging, hence exploratory face can never be declared as closed. In fact, a large number of taxa new to the science, have been established over a period of last few years. Table 1 give few such examples to justify the need of exploration of unexplored or under explored areas. Another factor which renders the existing floras insufficient and outdated, is invasion of new areas by different species. This also accounts for the mushrooming of new plant records. *Table 2* sight few new records for India as well as Upper Gangetic Plain.

Phytogeographical mapping or the identification of those pockets, where a given species is most likely to be met with, is very important. Especially in case of those plants which possess some economic importance or have been proved of some worth through ethnobotanical studies. No way, other than the extensive exploration can serve this purpose.

Man has exserted a tremendous pressure on the forest to

Table 1

Some Examples of New Taxa Established During 1980-1986

S.N.	Name of Taxon	Family	Year
GENUS			
1.	*Chandrasekharania* Nair, Ramchandran et Sree Kumar	Poaceae	1982
TAXA OF SPECIFIC AND SUBSPECIFIC RANKS			
1.	*Aspidopteris balakrishnii* Srivastava sp. nov.	Malpighiaceae	1983
2.	*Blumea obliqua* (Linn.) Druce Var.*arenaria* (DC.) Giri et B. Mitra, comb. nov.	Asteraceae	1984
3.	*Blumea obliqua* (Linn.) Druce var.*maritima* (Clarke ex Hook f.) Giri et B. Mitra, comb. nov.	Asteraceae	1984
4.	*Brachiaria munae* Basappa sp. nov.	Poaceae	1984
5.	*Bulbophyllum panigrahianum* S.Misra sp.nov.	Orchidaceae	1986
6.	*Bulbostylis swamyii* Govind. sp. nov.	Cyperaceae	1985
7.	*Coelachne ghatica* Naik sp. nov.	Poaceae	1980
8.	*Dendrobium nareshbahaduri* Naithani sp. nov.	Orchidaceae	1986
9.	*Eleocharis swamyii* Govind. sp. nov.	Cyperaceae	1985
10.	*Fimbristylis swamyii* Govind. sp. nov.	Cyperaceae	1985
11.	*Fuirena swamyii* Govind. sp. nov.	Cyperaceae	1985
12.	*Greenia bahadurii* Gaur et Dayal sp. nov.	Rubiaceae	1985
13.	*Hiptage jacobsii* Srivastava sp. nov.	Malpighiaceae	1984
14.	*Hiptage nayarii* Srivastava sp. nov.	Malpighiaceae	1984
15.	*Ischaemum keralensis* Sree Kumar, Nair et Nair sp. nov.	Poaceae	1985
16.	*Liparis vestita* Reich f.ssp. *seidenfadenii* S. Misra	Orchidaceae	1986
17.	*Meconopsis bikramii* Aswal sp. nov.	Papaveraceae	1985
18.	*Osbeckia nayarii* Giri sp. nov.	Melastomaceae	1983
19.	*Pegaeophyton garhwalensis* Chowdhry et Singh sp. nov.	Brassicaceae	1985
20.	*Pileostegia subansiriana* Naithani et Bennett sp. nov.	Hydrangaceae	1984
21.	*Rorippa pseudoislandica* Chowdhery et Rao sp. nov.	Brassicaceae	1985

S.N.	Name of Taxon	Family	Year
22.	*Scleria swamyii* Govind. sp. nov.	Cyperaceae	1985
23.	*Sonerila gamblei* Cir et Nayar sp. nov.	Melastomaceae	1985
24.	*Thottea duchartrei* Sivarajan, Babu & Indu sp. nov.	Aristolochiaceae	1985
25.	*Thottea ponmudiana* Sivarajan sp. nov.	Aristolochiaceae	1985
26.	*Trigonostemon aurantiacus* var.*rubrifolius* Balakr. et Chakrab.	Euphorbiaceae	1984
27.	*Trigonostemon nicobaricus* T. Chakrab. sp. nov.	Euphorbiaceae	1984
28.	*Trigonostemon nigrifolius* Balakr. et Chakrab. sp. nov.	Euphorbiaceae	1984
29.	*Trigonostemon sunirmalii* T. Chakrab. et Balakr. sp. nov.	Euphorbiaceae	1984

Table 2

Some Examples of New Records for India and Upper Gangetic Plain

S.N.	Name of Taxon	Family	Collected From	Reference	Year
NEW RECORDS FOR INDIA					
(A)	GENERIC RECORD				
1.	*Schizophragma* Sieb. & Zucc.	Hydrangeaceae	Kameng dist.(AP)	Naithani & Bennett	1979
(B)	SPECIFIC AND SUBSPECIFIC RECORDS				
1.	*Anagallis minima* (L.) F.H.Krause	Primulaceae	Tehri district	Goel & Bhattacharya	1986
2.	*Anagallis pumilla* var. ovalis (Ruiz. ex Pav.) R. Kunth.	Primulaceae	Tehri district	Goel & Bhattacharya	1986
3.	*Arabidopsis russelliana* Jafri	Brassicaceae	Kinnaur dist.(HP)	Rao & Chowdhry	1984
4.	*Calanthe anthropophora* Ridley	Orchidaceae	Meghalaya	Goswami & Joseph	1985
5.	*Clitoria arborescens* R. Br.	Fabaceae	Khasia Hill dist.	Bhaumik & Das	1983
6.	*Crotalaria kurzii* Baker ex Kurz	Fabaceae	-	Thothathri & Ansari	1979
7.	*Diospyros trichophyllus* Alston.	Ebenaceae	Silent Valley	Ramachandran and Bhargavan	1984
8.	*Elatostema longicaudatum* Greirson & Long.	Urticaceae	-	Jain & Gaur	1985
9.	*Eria globulifera* Seidenf.	Orchidaceae	Arunachal Pradesh	Naithani et al.	1985
10.	*Habenaria mandersii* Collet & Hensley	Orchidaceae	Kwakta, Manipur	Naithani & Som Deva	1984

S.N.	Name of Taxon	Family	Collected From	Reference	Year
11.	Hiptage candicans Hook. f.	Malpighiaceae	Nagaland	Srivastava	1983
12.	Papaver hybridum Linn.	Papaveraceae	Poonch (J. & K.)	Kiran and Kapahi	1983
13.	Pecteilis henryi Schlehter	Orchidaceae	Kwatka (Manipur)	Naithani & Som Deva	1983
14.	Pleioblatus simoni (Carriere) Nakai	Poaceae	Arunachal Pradesh	Naithani & Bennett	1986
15.	Rhus tomentosus Linn.	Anacardiaceae	Ootakamund (T.N.)	Chandran & Ghosh	1979
16.	Ruellia ciliatiflora Hook.	Acanthaceae	Dehradun	Naithani	1981
17.	Schizophragma integrifoliaOliver	Hydrangeaceae	Kamena district	Naithani & Bennett	1979
18.	Sida elongata Blume	Malvaceae	-	Mathew et al.	1983
19.	Sida javensis Cav.	Malvaceae	-	Mathew et al.	1983
20.	Spergularia diandra (Guss.) Helder & Sort	Caryophyllaceae	Farrukhabad dist.	Naithani and Ram Dayal	1981
21.	Vulpia ciliata Link.	Poaceae	Simla (H.P.)	Naithani & Bahadur	1979
22.	Wolffia columbia Karsten	Lemnaceae	Kashmir	Kak A.Majeed et al.	1978
23.	Wolffia papulifera Thomp.	Lemnaceae	Kashmir	Kak A.Majeed et al.	1978

S.N.	Name of Taxon	Family	Collected From	Reference	Year
NEW RECORDS FOR UPPER GANGETIC PLAIN					
1.	Canavalia microcarpa (DC.) Piper	Fabaceae	Delhi	Vishwanathan et al.	1984
2.	Centrostachys aquatica (R. Br.) Wall. ex Moq.	Amaranthaceae	Kheri district	Singh	1979
3.	Cnidium monieri (Linn.) Cusson.	Umbelliferae	Kheri district	Singh	1979
4.	Curcuma amada Roxb.	Zingiberaceae	Kheri district	Singh	1979
5.	Cyperus meeboldii Kuk.	Cyperaceae	Allahabad	Verma and Misra	1981
6.	Eragrostiella brachyphylla (Stapf.) Bor	Poaceae	Mirzapur	Roy and Shukla	1982
7.	Eragrostiella leioptera (Stapf.) Bor	Poaceae	Mirzapur	Roy and Shukla	1982
8.	Eragrostiella namaquensisSchrad. var. diplechnoides (Steud.) W.D. Clayton	Poaceae	Mirzapur	Roy and Shukla	1982
9.	Eragrostiella tenuifolius (A. Rich.) Steud.	Poaceae	Damoh (Badakpur)	Roy and Shukla	1982
10.	Eragrostis atrovirens (Desf.) Trin ex Steud.	Poaceae	Kheri district	Singh	1979
11.	Ipomoea quinnata R. Br.	Convolvulaceae	Kheri district	Singh	1979
12.	Jasminum roxburghianum Wall.	Oleaceae	Kheri district	Singh	1979

S.N.	Name of Taxon	Family	Collected From	Reference	Year
13.	Lactuca dolichophylla Kitamura	Asteraceae	Kheri district	Singh	1979
14.	Merremia quinquefolia (L.) Hall. f.	Convolvulaceae	Azamgarh	Singh and Veena	1980
15.	Scirpus corymbosus Heyne ex Roth.	Cyperaceae	-	Singh et al.	1980
16.	Scirpus laterifolius Gmel.	Cyperaceae	Azamgarh	Singh and Saini	1981
17.	Synedrella vialis (Less.) A.Gray	Asteraceae	Delhi	Vishwanathan et al.	1984

increase the acreage of cultivable land and to utilize the economic produce of the jungles. The inevitable has come about and the forests have shrunk alarmingly, thereby causing the extinction of numerous species. Many others have been pushed to the verge of extinction. For instance, according to an article published in Nature by Dransfield *et al* (1984), a palm, which most probably belong to the genus *Jubaea* and once inhabitat the Easter island, vanished around 1040-1280 A.D. (during this period deforestation occured on the island to erect the giant status "Moae"). It past existence on the island could be unravelled only from its shells unearthed from a cave during excavation. Now, these shells are the only material records of this taxon. This is also an established fact that a good number of plants species are yet to be discovered. A species once gone, is gone forever. There is no question of resurrection. Hence, there is need to launch an organized and country wide compaign to well help to point out the endangered species also.

In view of all these facts, the BSI chalked out the strategies to revised existing floras and explore new areas. In order to give an impetus to this program, "District Flora Scheme" was introduced in 1982 and by the end of second phase of development 47 districts had been alloted to various universities. Earlier, many districts were worked out by the researchers with different universities and colleges.

With this background of taxonomical awareness all over the country, a scrutining of the litrature to find out some recent publications on vegetation of Hardoi district proved futile. Duthie's Flora of Upper Gangetic Plain and Hooker's Flora British India could not report any single plant from Hardoi district. At this juncture it was decided to pick up this district to work out the flora. The area is much more interesting having rich vegetational wealth due to topographic and climatic spacificity. After the work of **Duthie** (1903-1929) for Upper Gangetic Plain in general, **Panigrahi** *et al* (1969) made an attempt to explore the area, however, complete and comprehensive flora did not come into existence. Another objective to know the traditional, medicinal uses of plants have been completed in due course with the help of rural inhabitant in this area. Continuous increasing stress over natural resources due to industralization and population stresses, the traditional culture is being extinct. It is, therefore important that before the oral folklore about plants and plant resources are lost forever, it must be properly documented.

The comparatively newer science "Ethnobotany" tries to throw light on critical understanding of human culture and vegetational world. The term ethnobotany was first coined by **Harshberger** (1896) without offering a definition. **Robbins** *et al* (1916) defined ethnobotany as a study and evaluation of the knowledge of all phases of plants life among primitive socities and of the

effects of the vegetal environment upon the life, customs, beliefs and history of the people of such socities. Later on, **Vestal** and **Schultes** (1939), **Schultes** (1962), **Jones** (1941), **Castetter** (1944) and **Jain** (1987) have defined ethnobotany in different ways. Recently, **Jain** (1987) in presidential address of 10th Indian Botanical Society, define ethnobotany as "the total natural and traditional relationships and the interaction between man and his surroundings plant wealth".

Ethnobotanical explorations are being carried out in different parts of the country. In 1982, All India coordinated research "Project on Ethnobiology", has been launched through Ministry of Environment, Forest and Wild Life, Government of India to complete this work. However, in Uttar Pradesh few publications recently appeared on the ethnobotany of Banda (**Saxena & Vyas**, 1981), Garhwal (**Gour** *et al*, 1980; **Nautiyal**, 1981; **Maheshwary & Singh**, 1984), Jhansi and Lalitpur (**Saxena & Vyas**, 1981; **Dixit & Pandey**, 1984), Kheri (**Maheshwary** *et al*, 1986), Varanasi (**Singh & Maheshwary**, 1983, 1985), but Hardoi district is completely unexplored so far. Keeping this in view, the present study was undertaken to explore the district floristically and ethnobotanically.

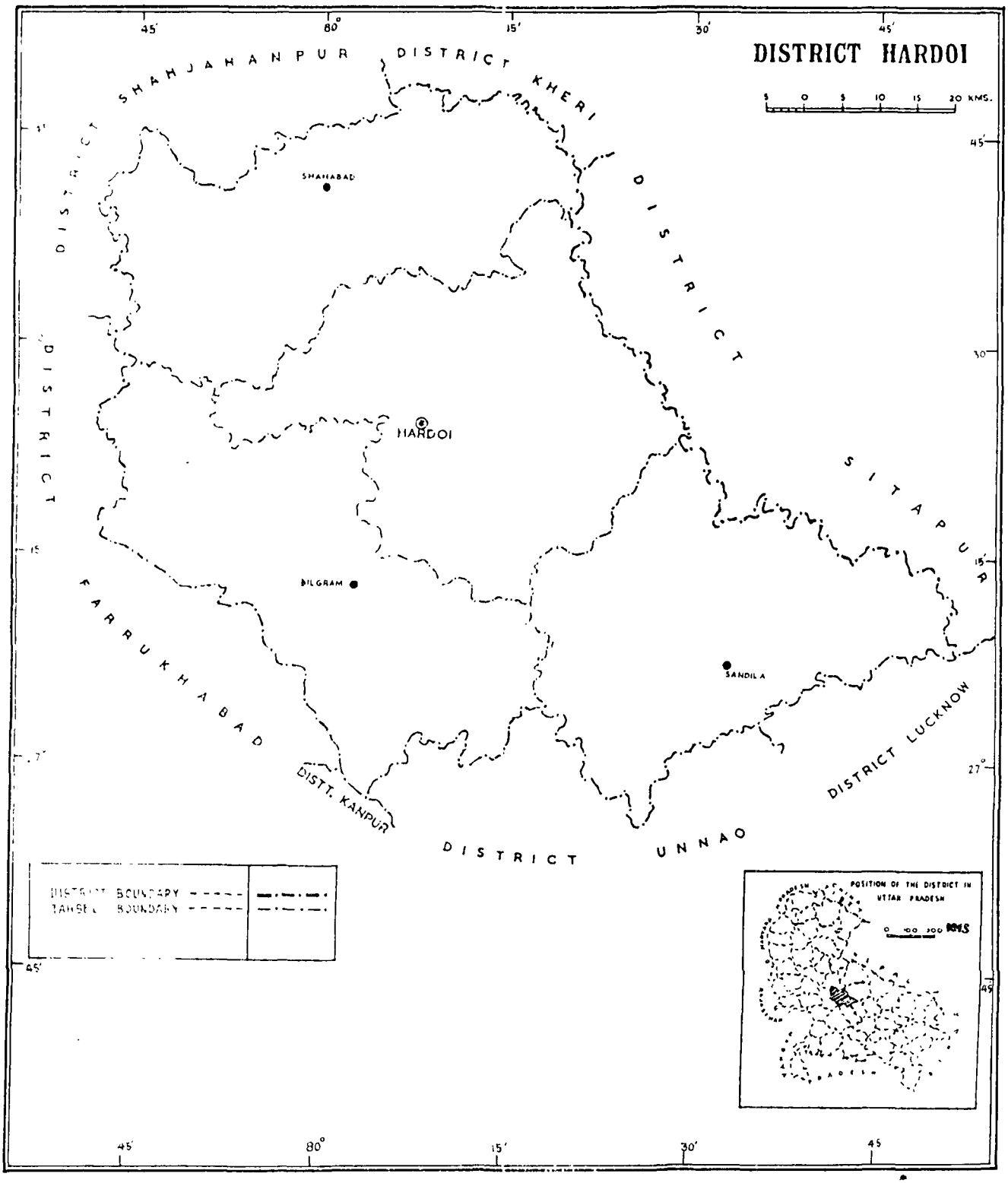
HARDOI TEHSIL

Geographical position of an area, its geology, topography and rivers *etc.* play a dicisive role in determining the vegetation type. A brief description of these factors is given, with reference to Hardoi tahsil, in ensuing paragraphs.

GEOGRAPHICAL POSITION AND GEOLOGY

Hardoi district lies between 26° 53′ - 27° 47′ N and 79° 41′ - 8Ø° 49′ E. It is bounded on the north by district Shahjahanpur and Kheri. On the east the Gomati river separates it from district Kheri and Sitapur. On the south lie the district of Unnao and Lucknow, while to the west are the districts of Shahjahanpur and Farrukhabad and, for a very short distance in the south-western corner, the Kanpur district. Hardoi had an area of 6Ø12 Sq. Kms.

Geologically the district forms part of the vast Indo-Gangetic alluvial tract. The origin of the Indo-Gangetic tract as a whole is now attributed to sag in the earth's crust, formed in the upper Eocene times, between the Gondwana land and the raising Himalayan belt. The older alluvium, locally known as bangar, forms slightly elevated terraces, usually above the flood level. The newer alluvial locally called 'Khadar', are contained to the lowland tracts. The economic minerals found in the district are kankar, reh and sand.


DISTRICT HARDOI
5 0 5 10 15 20 KMS.
45'
80°
15'
30'
45'
DISTRICT SHAHJAHANPUR
DISTRICT KHERI
DISTRICT SITAPUR
DISTRICT FARRUKHABAD
DISTT. KANPUR
DISTRICT UNNAO
DISTRICT LUCKNOW
SHAHABAD
HARDOI
BILGRAM
SANDILA
30'
15'
27°
DISTRICT BOUNDARY
TAHSIL BOUNDARY
POSITION OF THE DISTRICT IN UTTAR PRADESH
0 100 200 KMS

RIVERS

The main rivers running through the district are Ganga, Ramganga, Garra and Gomati. The Ganga alongwith Garra and Ramganga drains the lowland and the Gomati flows along the eastern boundary of the district. A brief account is given below.

1. Ganga:

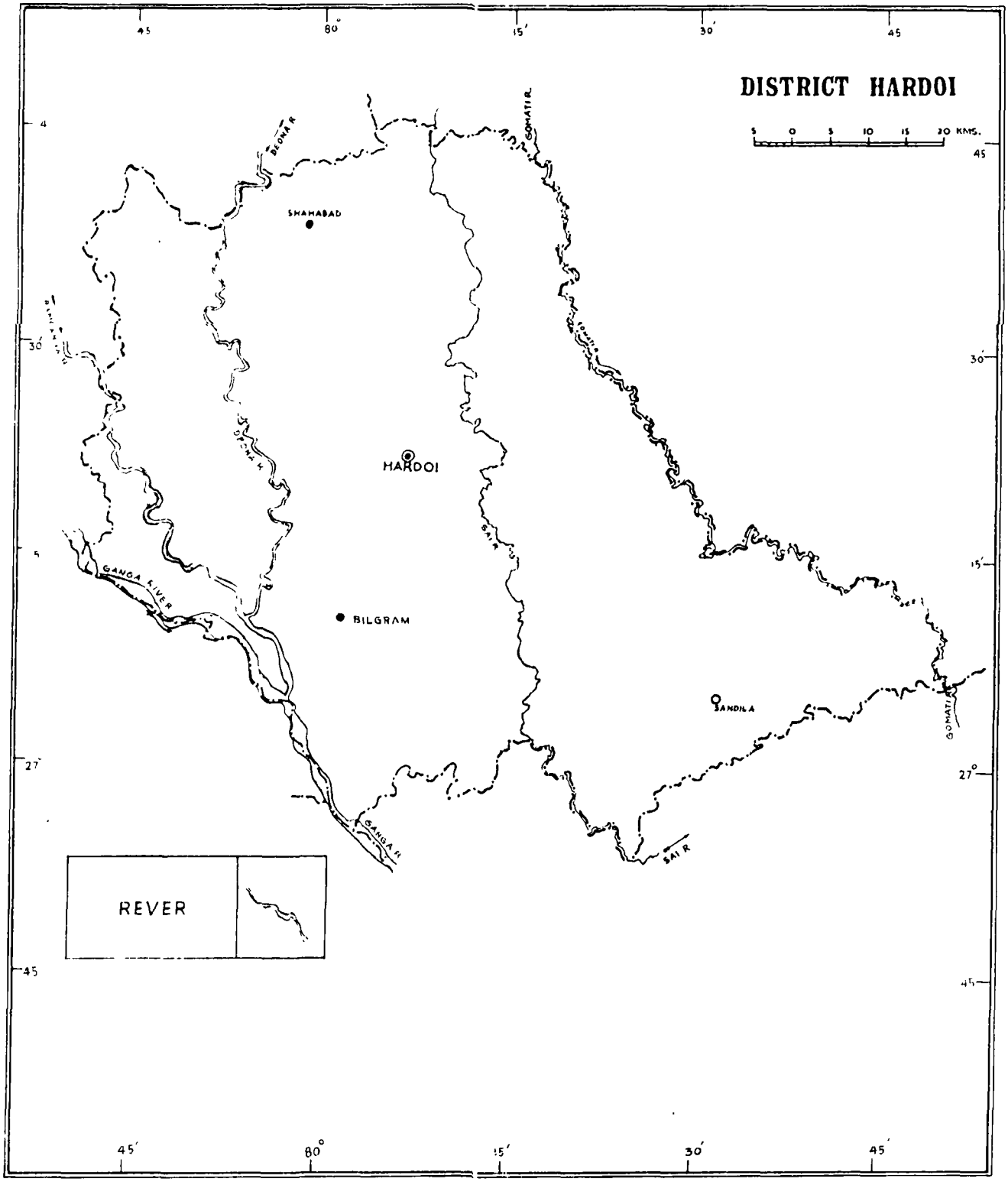
It first touches the district at Godanpur in pargana Katiari and runs south-eastward to Bichhohia near which it is joined by the Ramganga. Flowing in the same direction for about a kilometre it bends southward and runs along the border of tahsil Bilgram, leaving the district in the extreme south of that tahsil. All along its course the river forms the south-western boundary of the district which separates it from district Farrukhabad and Kanpur.

2. Ramganga:

It makes its way through the Shahabad tahsil near the boundaries of districts Farrukhabad, Shahjahanpur and Hardoi to join the Ganga at some distance. It runs south-eastward in a tortuous and irregular course through parganas Katiari and Sandi, in places forming the boundary between the two parganas.

3. Garra:

It touches the district near Udharanpur, and runs south-westwards, separating the Hardoi from the district Shahjahanpur,


DISTRICT HARDOI
5 0 5 10 15 20 KMS.
SHAHABAD
HARDOI
BILGRAM
SANDILA
BAIR
GANGA RIVER
GANGA R.
SAI R
GOMATI R.
REVER

for about 13 Km. It enters the district near Basitnagar in pargana Shahabad and Saroman-nagar on the east from parganas Pachhoha and Pali on west.

4. Gomati:

This river first touches the district in the extreme north of pargana Pihani near the village of Jahani khera and runs south-eastward, separating district Hardoi from district Kheri and Sitapur. There are 4 tributary of the Gomati.

(i) Sai

It flows southward in an exceeding tortuous and irregular course eventually turning south-east along the south-western boundary of tahsil Sandila and passing into the district of Unnao at Zahidpur. In its upper course it is also known as the Bhasenta. It separates pargana Alamnagar from pargana Pandarwa and form the eastern boundary of Sarah south.

(ii) Atarban

This stream also known as Arin, rises in a lake to the west pargana Gopamau and joins the Gomati at Babuapur.

(iii) Garera

It forms the southern boundary of pargana Gopamau and joins the Gomati near the village of Jamunian.

(iv) Behta

Flows in a south-easterly direction along the south-western border of pargana Kalyanmal as far as the village Poharpur.

SOIL

The district consists of two main natural divisions which are separated by the old high bank of the Ganga, a line roughly running down the centre of the western half, from north to south. East of this line, the country is a high and fairly level plain, known as the Bangar or uplands. The western division comprises the kachh or lowlands, a purely alluvial tract, traversed by numerous rivers and streams.

On the level ground, the soil is a mixture of sand and clay generally known as Dumat or loam. In the lowlands the soil is chiefly clay varied by sands near the rivers or the fine loam deposits brought down by the floods. The classification of soil of the district is given below.

Kachhiana - special soil for growing tobacco.

Goind I - lands of good quality near the village sites, receiving natural manure.

Goind II - land near habitations, of indifferent quality or impaired by such defects as slope, shade of trees.

Dumat I - level loam of good natural quality well worked and manured.

Dumat II - (a) land good natural quality without particular advantage; or (b) land of inferior natural quality but with some special advantages.

Dumat III - (a) sandy or stiff soil of poor quality, possessing no special advantage, (b) soil on the borders of usar land, mixed with usar patches and definitely inferior, (c) soil close to jhils liable to submersion.

Dumat IV - poorest soil, generally in midst of usar plains or precarious land, liable to over saturation or submersion.

Dhan I - superior paddy land.

Dhan II - (a) land possessing deficient means of late irrigation for late paddy, (b) superior early paddy land.

Dhan III - very poor early paddy land, growing only a single crop of rice which is entirely dependent on rains.

Bhur I - good, level Bhur land, intermediate between Dumat and Bhur, having both kans and doob.

Bhur II - excessively sandy Bhur, either level or sloping, having only kans.

Bhur III - still poorer and worthless sandy land on top of sandhills or in ravines.

The lowlying land in the Khadir of a river, below the sandy cliff marking the edge of an upland, has been named as the Taran.

Tarai I - rich lowlying alluvium on a level surface.

Tarai II - average lowlying alluvium, often on the slopes.

Tarai III - sandy uneven soil or land, liable to suffer from excess of moisture or reh.

Tarai IV - very poor sandy soil on undulating sandhills, liable to suffer from over saturation or excess of reh.

Brief Description of Tahsils

1. HARDOI

Tahsil Hardoi, the central subdivision of the district lies in 27° 23′ N and 80° 7′ E, comprises parganas Bangar, Gopamau, Sarah south, Bawan and Barwan and is bounded on the north-west and north by tahsil Shahabad, on the east by district Sitapur, on the south-east by tahsil Sandila and on the south and west by tahsil Bilgram. It had an area of 1937.72 Sq. Kms. contained 471 inhabited and 21 uninhabited villages.

2. SHAHABAD

The tahsil of Shahabad lies in 27° 38′ N and 79° 57′ E, which forms northern part of the district, comprises parganas Shahabad, Pachhoha, Pali, Saromnagar, Alamnagar, Sarah North, Mansurnagar and Pihani and is bounded on the north by district Shahjahanpur and Lakhimpur kheri, on the east, by parts of

districts Kheri and Sitapur, on the south by tahsils, Hardoi and Bilgram and on the west by district Shahjahanpur. It had an area of 1395.24 Sq. Kms. and contained 526 inhabited and 37 uninhabited villages.

3. BILGRAM

The Bilgram tahsil lies in 27° 11' N and 8Ø° 2' E, of the district, comprises the parganas of Katiari, Sandi, Bilgram, Mallanwan and Kachhandao and is bounded on the west by district Farrukhabad, on the north by tahsils Shahabad and Hardoi, on the east by tahsil Sandila and on the south by district Unnao. On the south-west, it is separated by the Ganga from district Kanpur and Farrukhabad. It had an area of 1518.39 Sq. Kms. contained 474 inhabited and 31 uninhabited villages.

4. SANDILA

Tahsil Sandila, the eastern tahsil of the district lies in 27° 4' N and 8Ø° 3Ø' E, comprises parganas Sandila, Gundwa, Kalyanmal and Balamau and is bounded on the north and north-east by the Gomati river which separates it from district Sitapur, on the south-east by district Lucknow, on the south by district Unnao, on the west by tahsil Bilgram and on the north-west by tahsil Hardoi. It had an area of 1439.23 Sq. Kms. and contained 415 inhabited and 2 uninhabited villages.

CLIMATE

relative humidity, high temperature and small variation in these factors characterized rather monotonous environment of the rich and luxuriant subtropical flora.

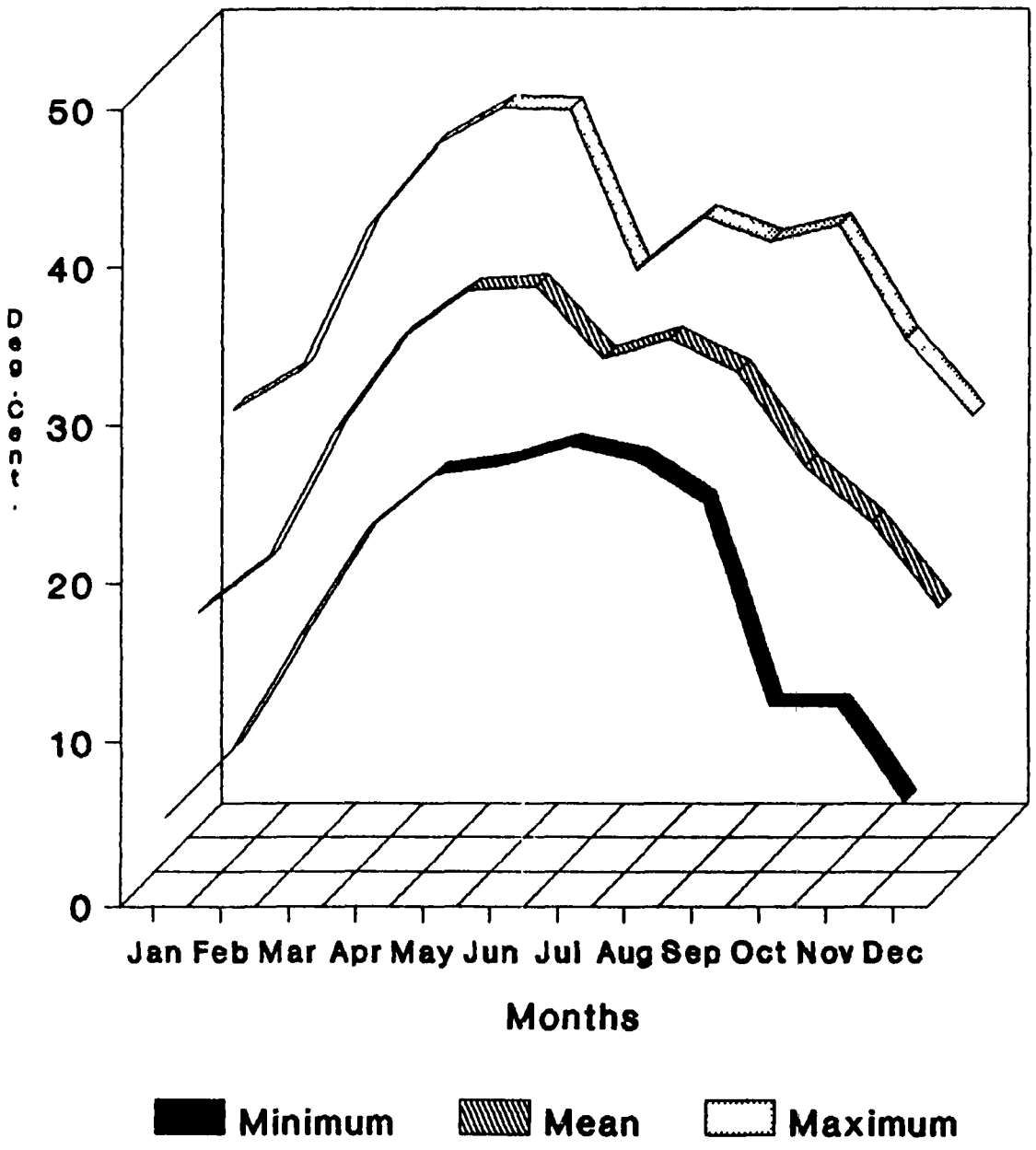
Hardoi experiences a subtropical type of climate which is characterized by a seasonal rythm produced by the south-west and north-west monsoons. The direction of the wind is generally from north-west to south-east in the north-east monsoon season and from south-east to the north-west during the south-west monsoon season. The south-west monsoon season from mid-June to October, is influenced by the humid winds of the oceanic origin, and its main characteristics of cloudy weather, heavy rainfall and high relative humidity. The remaining period of the year is generally characterized by dry winds of the continental origin and is marked by extremes of temperature, clear sky and low humidity. Taking the direction and nature of the winds in view, the terms dry monsoon and wet monsoon are more appropriate.

Based on the foregoing account, the year can be climatically splitted into three main seasons: from March to middle of June, the summer season; after that till October, the rainy season; thereon upto February is the winter season.

SUMMER SEASON:

This season characterized by high temperature, low humidity

Mean Monthly Temperature
(1986-1988)



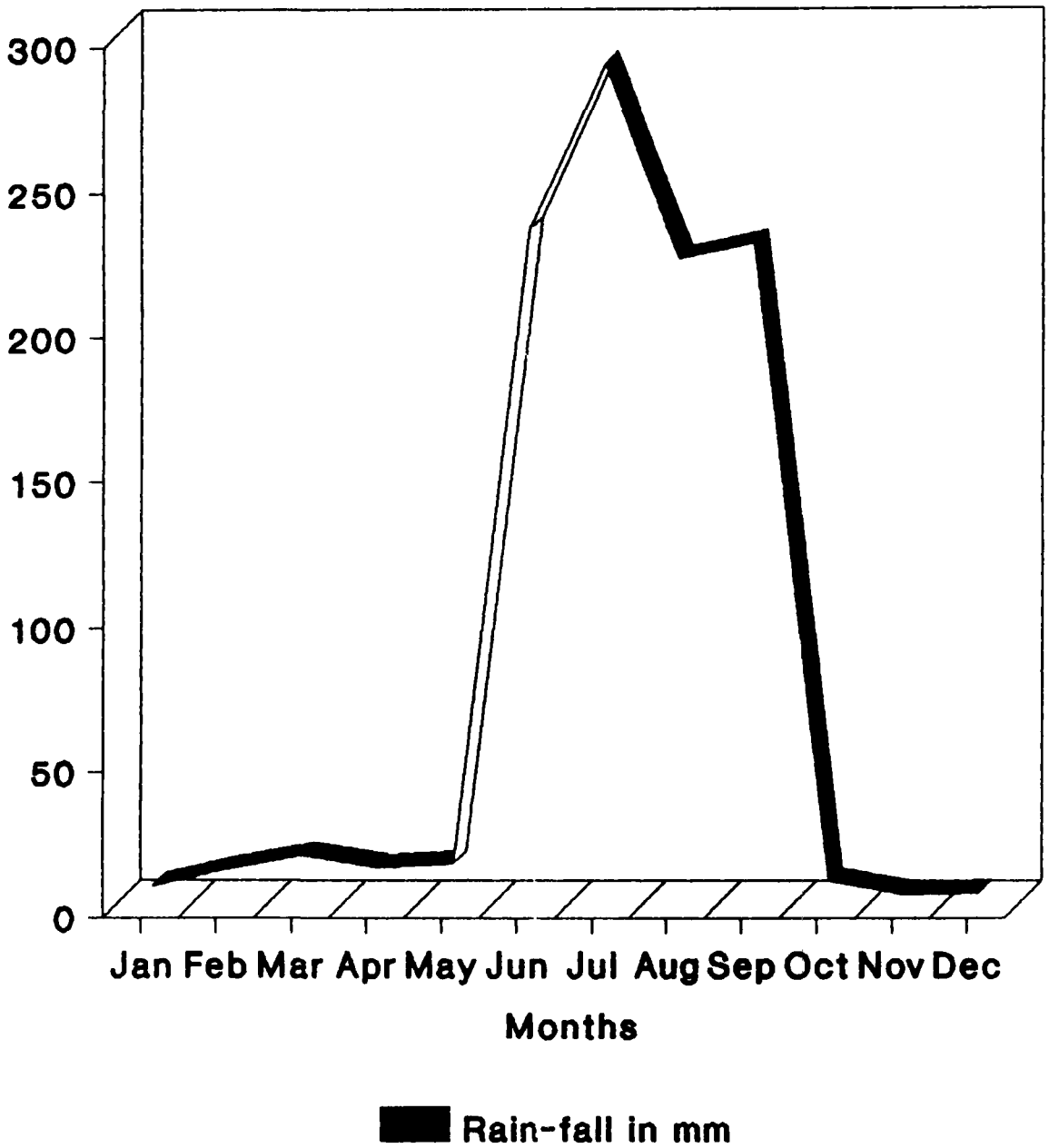
and scortching sun, begins from the month of April and continues upto end of June. In the month of May the mercury may rise as high as 45.2Ø°C (*Table 1*, **Fig. 1**), the mean temperature being 23.78- 35.99°C. Hot and dusty, westerly winds of considerable velocity 7.4 km/h, locally called as 'Loo', blow in the noon and cause significant damage to both plants and animals. Herbaceous flora vanishes almost totally and even large shrubs and trees fall victim to the atrocities of these winds, unless properly protected and regularly watered. The amount of precipitation received during these months come next to the rainy season. The maximum being 14.33 mm in May and minimum 13.ØØ in April (*Table 2*, **Fig. 2**). Relative humidity in these months is as its lowest, the average being 33.16% (*Table 3*, **Fig. 3**). In the short it is not a very incouraging season from exploration point of view.

Table 1

Mean Monthly Temperature (1986-1988)

Months	Maximum	Minimum	Mean
January	26.16	4.7Ø	15.43
February	28.6Ø	8.86	18.73
March	37.6Ø	16.Ø3	26.81
April	42.8Ø	22.76	32.78
May	45.2Ø	26.26	35.73
June	45.13	26.86	35.99
July	34.9Ø	28.Ø6	31.48
August	38.26	27.16	32.71
September	36.7Ø	24.5Ø	3Ø.6Ø
October	37.73	11.63	24.68
November	3Ø.6Ø	11.63	21.11
December	25.76	5.7Ø	15.73

Mean Monthly Rain-fall
(1986-1988)



RAINY SEASON:

High temperature prevailing in plains in summer months forms a zone of low air pressure, thereby causing the oceanic winds, saturated with water vapours, to blow from bay of Bengal in south-east direction. These winds locally called as 'Monsoon' commence in the middle of June. The area received its maximum rainfall amount 290 mm (*Table 2*, Fig. 2) due to the generosity of these winds. This season is characterized by high temperature (Mean temperature equals that in summer season) with occasional abatments during down pours and maximum upto 86.66% humidity of the year (*Table 3*, Fig. 3). The sun becomes more scortching because of dust free atmosphere. Vegetatively, it is the richest period of the year. Maximum number of herbs, shrubs and trees bloom in this season.

Table 2

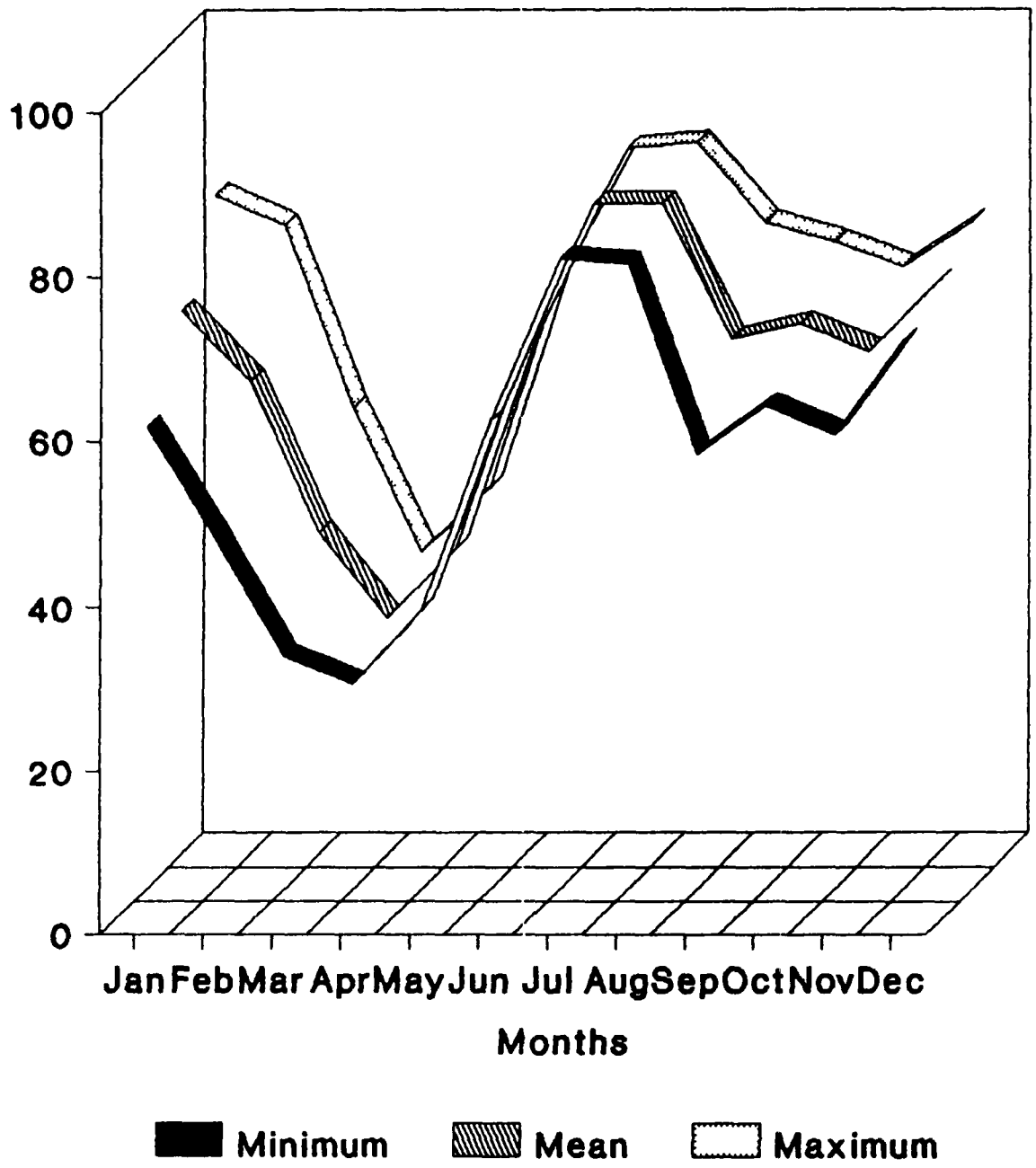
Mean Monthly Rain-fall in mm (1986-1988)

Months	Rain-fall
January	6.66
February	12.46
March	17.33
April	13.00
May	14.33
June	233.33
July	290.00
August	223.33
September	228.83
October	8.50
November	3.96
December	4.43

Mean Monthly Relative Humidity %

(1986-1988)

(between noon 12.00 and 4.00 P.M.)



WINTER SEASON:

The ends of the rain heralds the onset of season. This season is characterized by low temperature, low humidity, a brief spell of rains, occasional frost in the night and fogs in morning. The mercury starts descending from the month of October and sometimes plunging as low as 4.7-5.7°C (*Table 1*, **Fig. 1**) in January and February. The relative humidity records an average of 70.33%. There is a brief spell of rains locally called as 'Mahavat' in the month of January. These rains are very important from agricultural point of view. Vegetatively this season has a lot to offer. A large number of plants provide a lush-green covered to the earth. For trees this season, deciduous trees shed their leaves and new ones appear in march.

Table 3

Mean Monthly Relative Humidity Percentage (1986-1988)

(between noon 12.00 and 4.00 P.M.)

Months	Maximum	Minimum	Mean
January	80.33	60.33	70.33
February	76.66	47.00	61.83
March	54.33	32.66	43.49
April	37.00	29.33	33.16
May	44.66	38.33	41.49
June	71.00	61.00	66.00
July	86.00	81.00	83.50
August	86.66	80.33	83.49
September	77.00	57.00	67.00
October	74.66	63.00	68.83
November	71.66	59.33	65.49
December	77.00	71.00	74.00

PLAN OF WORK
AND
PRESENT STUDY

In order to carry out the work systematically and make the maximum utilization of the time, a plan of work was chalked out well before starting with the project. The plan consisted of three phases:

1. Field work
2. Laboratory work
3. Compilation

Each phase is described here in brief.

1. FIELD WORK:

This includes the collection of plants with ethnobotanical data, if any, and related field notes, tagging and pressing the specimens on the spot, if possible.

To ensure the extensive coverage of the area, the head-quarter of each pargana was designated as centre point. In first year, the area lying within a radius of 5 Km from each centre was combat. In second year the area of operation was extended as far as 20 Km. The tour programmes were so framed as to visit each locality atleast once in 15 days.

Necessary field equipments *e.g.* knife, secateur, hoe, a plastic rope with a hook tied to one end (to pullout the hydrophytes from water) and field book etc. were used. Vasculum was replaced by polythene bags. They did well in rainy and winter seasons without any accessory However, in summer season they

were wrapped with a wet cloth to save the specimens from getting shrivelled. Field observations for each specimen collected were noted down in a field book on a separate and numbered page. A tag bearing the same number was attached to the specimen concerned to avoid any confusion, whatsoever, during processing. Experience showed that the pressing of specimens in the field was usually tedious and sometimes even annoying because of fast wind or strong sunshine. Furthermore, the quality of final product was also found adversely affected. Hence, mostly pressing was done after returning to the camp. However, plants with ephemeral flowers were pressed on the spot. While taking field notes, following points were kept in mind:

1. Habit and habitat
2. Approximate relative abundance of each species
3. Colour of latex, if present and aroma of plant
4. Nature of deposition, if any, on leaf and stem
5. Flower colour and scent
6. Time of opening and closing of flowers
7. Local name

In case of trees, following additional points were noted:

1. Size
2. Shape of crown
3. Canopy, open or dense
4. Features of bark
5. Presence or absence of buttresses

6. Leaf fall

7. Emergence of new leaves, whether preflowering, post-flowering or simultaneous.

Ethnobotanical Informations:

During the field work first hand information related to ethnobotanical aspect with special reference to medicinal values were also gathered. To acheive this goal, herbalist and villagers who have the practical approach and knowledge about the medicinal plants were interviewed.

2. LABORATORY WORK:

This include pressing of specimens, if not done already, preparation of a diagnostic description from fresh material, sketching, poisoning, mounting and finally filing.

For pressing, blotting paper sheets or old news papers were used. Every care was taken to avoid deshaping and overlapping of plant parts. Whenever necessary, some leaves or branches were trimmed off leaving behind the stumps. Hydrophytes needed a little more care and technique as their parts tended to stik together because of their filmy and mucilagenous nature. The procedure included the floating of specimens on water to make the parts spread. A paper sheets of suitable size was then slide under the specimen and lifted. The water was allowed to run off and the sheet was pressed as such. It was, often, found risky to

remove the specimen from this sheet, hence the sheet was mounted along with the specimen.

Fresh specimens was critically examined under a binocular stereomicroscope. Only those features were picked up which showed the promise of being diagnostic in nature.

Identification was done in two steps. Firstly, the specimens were tentetively identified using regional floras (Duthie's Flora of Upper Gangetic Plain and Hooker's Flora of British India). The final verification was done by matching with specimens lodged in AMU Herbarium or the herbaria of FRI, Dehradun, BSI (Northern Circle) Dehradun and Central National Herbarium, Sibpur, Howrah.

Dried and pressed specimens were poisoned by dipping in 2% alcoholic solution of mercuric chloride to do away with those pests and fungi which continue their antibotanical activities even in dried plants.

Poisoned specimens were mounted onto herbarium sheets of standard size (29x42 cm) with the help of Fevicol (a synthetic adhesive). Entries of the label *e.g.* plant name, family, ecological notes and collecter's name etc. were completed with the help of field book.

Sheets carrying the specimens of same species were placed in

a single species cover and such covers belonging to the same genus were placed in a genus cover. Families were arranged following the system of Bentham and Hooker.

3. COMPILATION:

This phase included updating of nomenclature according to the rules laid down by "International Code of Botanical Nomenclature (Leningrad Code, 1978)" preparation of keys to genera and species and lastly the treatment of individuals families. Names appearing in recent monograph, papers dealing with nomenclature in standard journals and latest floras have been adopted. References to these sources will be found at places.

Keys given in systematic portion are artificial and of dicotomous type. It has been endeavoured to prepare them in such a way as to supplement those usually found in floras. The taxa showing considerable variations have appeared more than once in the key and most of the cultivated taxa have not been included in the key. Only those characters have been taken into reckoning which could be easily observed, at the most, with the help of a hand lens.

Families have been arranged in accordance with the system of Bentham and Hooker with slight modifications. This system has been adopted because of its practical merit and prevalance in India. Each family begins with a key to genera followed by more

than one species, correct name is followed by a short synonym, description, flowering and fruiting period and lastly the place of collection. In case of a number of taxa a short list of the plants, which usually grow in association, is given an idea of the composition of vegetation.

VEGETATIONAL COMPOSITION

A particular type of habitat does not extend hospitality to all kind of plants. This is an undeniable fact that the type of habitat, available for plant growth, can not be uniform over a large tract. At some places we find agricultural fields, on other side there may be a patch of saline soil, and at a few places there may be pond. With the changing habitat, a marked change in plant communities is also noticed, to such an extent, that by just having a glance on the habitat, presence or absence of a particular plant may be, sometimes, exactly predicted. The vegetation of Hardoi may be grouped under following heads and subheads.

A. Permanent vegetation

B. Seasonal vegetation

A. PERMANENT VEGETATION:

The permanent vegetation of the area is presented by trees, shrubs and lianas. The vegetation of the area is moist deciduous type with some evergreen and semievergreen trees. Most of the trees shed their leaves at the begining of winter season, while others during the hot summer months. For the sake of convenience, the permanent vegetation of the forest may be divided into five distinct types, *viz.*,

1. Sal forest
2. Teak forest
3. Swamp forest
4. Mixed forest
5. Grassland forest

1. Sal Forest:

The forest of this type occupies the major part of the forest area. The forest can easily be distinguished into three distinct storeys.

a. The dominant trees of top storey: are

Ailanthus excelsa Roxb.,

Bombax ceiba Linn.,

Ficus benghalensis Linn.,

Tectona grandis Linn. f.,

Madhuca indica Gmel.,

Terminalia tomentosa Wt. & Arn.,

Terminalia arjuna (Roxb. ex DC.) Wt.& Arn. and climbers like

Bauhinia vahlii Wt. & Arn.,

Capparis zeylanica Linn.,

mostly reach top of the forest canopy.

b. Dominant plant of middle storey: are

Aegle marmelos (Linn.) Correa,

Holarrhena antidysenterica (Linn.) Wall.,

Lagerstroemia speciosa (Linn. ex Murray) Pers.,

Miliusa velutiana Hook. f. & Thoms.,

Schleichera oleosa (Lour.) Oken.,

Strebulus asper Lour., with climbers like

Abrus precatorius Linn.,

Cissampelos pareira Linn. and

Ziziphus oenoplia (Linn.) Mill.

c. The third storey constitutes by shrubby undergrowth: are

Vitex negundo Linn.,

Chlerodendrum indicum (Linn.) O. Kuntze,

Clerodendrum viscosum Vent.,

Helicteres isora Linn., and

Murraya koenigii Spreng.

Ground flora of the forest consists of-

Desmodium gangeticum DC.,

Elephantopus scaper Linn.,

Urena lobata Linn. etc.

2. Teak Forest:

This type of forest covers comparatively less area than the Sal forest and met within part oi Sadai behta, Bilgram, Sandila. This type of forest is completely deciduous, except a few evergreen trees (*Strebles asper* Lour. and *Glycosmis pentaphylla* Correa.) and shrubs. The chief associates of teak forest are:

Albizia lebbeck (Linn.) Benth.,

Albizia procera Benth.,

Cassia fistula Linn.,

Glycosmis pentaphylla Correa.,

Mallotus philippensis Muell. Arg.,

Streblus asper Lour. etc.

The undergrowth in teak forest is poorly developed and is

represented by-

Chlerodendrum viscosum Vent.,

Elephantopus scaber Linn.,

Urena lobata Linn.,

Woodfordia fructicosa Kurtz.,

Xanthium strumarium Linn. etc.

Some of the common climbers found in this forest are:

Abrus precatorius Linn.,

Cissampelos pareira Linn. etc.

3. Swamp Forest:

This type of forest met with on the more stable riverain flats which are subject to occasional flood and tend to be water lagged during rainy season, but which dry out during rest of the year. This type of forest is chiefly found along the rivers, 'tals' and 'nalas'. The characteristic species found in this area are:

Acacia nilotica (Linn.) Del.,

Alangium salvifolium (Linn. f.) Wang.,

Alstonia scholoris (Linn.) R. Br.,

Barringtonia acutangula Gaertn.,

Bombax cieba Linn.,

Putranjiva roxburghii Wall.,

Ipomoea fistulosa Mart. ex Choisy,

Lagerstroemia speciosa (Linn. ex Murray) Pers.,

Syzygium cumini Linn.,

Tamarix dioica Roxb.,

Vitex negundo Linn. etc.

The main climbers occurring in this type are:

Ichnocarpus frutescence R. Br.,

Cissampelos pareira Linn. and

Tinospora cordifolia (Willd.) Hook. f.

The ground flora gets totally absent during rainy season due to inundation.

4. Mixed Forest:

This type of forest is characterized by association of a large number of species of varied nature. The forest is very dense and consist of large and medium sized deciduous and evergreen plants.

Some common species constituting this type of forest are:

Acacia nilotica (Linn.) Del.,

Ailanthus excelsa Roxb.,

Bombax ceiba Linn.,

Chlerodendrum viscosum Vent.,

Emblica officinalis Gaertn.,

Lagerstroemia speciosa (Linn. ex Murray) Pers.,

Tectona grandis Linn. f.,

Terminalia bellirica Roxb.,

Terminalia tomentose Wt. & Arn.

Toona ciliata M. Roem.,

Ziziphus nummularia Wt. & Arn.,

Ziziphus oenoplia Mill. etc.

The climbers commonly found in the mixed forest are:

Ampelocissus latifolia (Roxb.) Planch.,

Antigonon leptopus Hook. & Arn.

Capparis zeylanica Linn.,

Cardiospermum halicacabum Linn.

Cocculus hirsutus (Linn.) Diels.,

Ichnocarpus frutescence (Linn.) R. Br.,

Tinospora cordifolia (Willd.) Hook. f. etc.

5. Grassland Forest:

Mixed forest gradually extends into grasslands which are represented in low-lying area, from where rain water drains out quickly. The common species constituting the grassland vegetation are:

Apluda mutica Linn.,

Arundo donax Linn.,

Cyndon dactylon (Linn.) Pers.,

Cyprus compactus Retz.,

Cyprus rotundus Linn.,

Desmostachya bipinnata (Linn.) Stapf.,

Dicanthium annulatum (Forsk.) Stapf.,

Heteropogon contortus (Linn.) P. Beav. ex Roem. & Schult.,

Sachhrum spontaneum Linn.,

Themeda arundinacea (Roxb.) Ridley,

Vetiveria zizanioides (Linn.) Nash etc.

B. SEASONAL VEGETATION:

This type of vegetation is much influenced by seasonal changes and includes the herbacious flora of different season growing on variety of habitats. The seasonal vegetation of the area exhibits wonderful periodicity in accordance with the seasonal changes with some overlapping. The number is much greater during rainy season than either of winter or summer season, mainly due to most favourable conditions for growth. The dominant species of the tree in different season are as under:

Herbs Of Rainy Season:

With the onset of 'monsoon', a large number of herbs make their luxuriant appearance. The most common herbs found in this season are:

Abutilon indicum Sweet,

Achyranthes aspera Linn.,

Alysicarpus monilifer (Linn.) DC.,

Anisomeles indica (Linn.) Kuntze,

Bacopa monnieri (Linn.) Penn.,

Biophytum sensitivum (Linn.) DC.,

Boerhavia diffusa Linn.,

Cannabis sativa Linn.,

Cassia obtusifolia Linn.,

Cassia tora Linn.,

Centella asiatica (Linn.) Urb.,

Cleome gynandra Linn.,

Cleome viscosa Linn.,

Commelina benghalensis Linn.,

Corchorus capsularis Linn.,

Crotolaria medicagenea Lamk.,

Croton bonplandianum Baill.,

Desmodium gangeticum DC.,

Gloriosa superba Linn.,

Leucas asper (Willd.) Link.,

Polygala arvensis Willd.,

Trianthema portulacastrum Linn.,

Tribulus terrestris Linn. and

Urena lobata Linn.

The common sedges and grasses recorded during this period are:

Bulbostylis barbata (Rottb.) Clarke,

Cyperus compressus Linn.,

Cyperus difformis Linn.,

Cyperus iria Linn.,

Cyperus kyllinga Endl.,

Cyperus rotundus Linn.

Fimbristylis miliacea Vahl.

Coix lachrymajobi Linn.,

Echinochloa colonum (Linn.) Link. and

Eragrostris tenella (Linn.) Beauv.

The climbers and twinners which occur during this period are:

Clitorea ternatea Linn.,

Ipomea pesti-gridis Linn.,

Mukia maderspatana (Linn.) M. Roem. and

Rhynchosis minima DC. etc.

Herbs Of Winter Season:

With the advance of cold weather most of the rainy season herbs succeeded by plants like-

Ageratum conyzoides Linn.,

Anagalis arvensis Linn.,

Argemone mexicana Linn.,

Asphodelus tenuifolius Cav.,

Blumea lacera (Burm. f.) DC.

Euphorbia dracunculoides Lamk.,

Evolvulus alsinoides (Linn.) Linn.,

Fumaria indica (Hassk.) Pugsley,

Gnaphalium leuteoalbum Linn.,

Lathyrus aphaca Linn.,

Lathyrus sativus Linn.,

Lepedium sativum Linn.,

Oxalis corniculata Linn.,

Solanum nigrum Linn.,

Sphaeranthus indicus Linn. and

Vicia hirsuta (Linn.) S. F. Gray

The grasses which are commonly found during this period are:

Apluda mutica Linn. and

Heteropogon contortus (Linn.) P. Beauv. ex Roem. & Schult.

Herbs Of Summer Season:

The herbacious plants of rainy season become disappearing due to gradual increase in temperature and the forest ground gets covered with the fallen dry leaves predominantly in deciduous forest. During summer months the plants which are found in different habitats are:

Bacopa monnieri (Linn.) Penn.,

Blumea oxyodonta DC.,

Blumea mollis (D. Don) Merr.,

Blumea laciniata (Roxb.) DC.,

Boerhavia diffusa Linn.,

Cannabis sativa Linn.,

Circium arvens (Linn.) Scop.,

Conyza aegyptiaca (Linn.) W. Ait.,

Heliotropium indicum Linn.,

Solanum surattense Burm. f. and

Yongia japonica (Linn.) DC. etc.

The common sedges and grssses of this season are:

Carex fedia Nees,

Desmostachya bipinnata (Linn.) Stapf.,

Echinochloa colonum (Linn.) Link.,

Eleocharis palustris R. Br.,

Eragrostis unioloides Retz.,

Fimbristylis ovata (Burm.) Kern.,

Oplismenus burmannii (Retz.) P. Beauv.,

Paspalidium flavidum (Retz.) A. Camus,

Scirpus affinis Roth. and

Sorghum halepense (Linn.) Pers.

VEGETATION OF SPECIAL HABITAT

The characteristic species are collectively the best indicators of ecological conditions of the community, Santapau (1958a) stated that the plants are admittedly a measure of the environment and although the community indicate the nature of the surroundings, only few key species which are restricted to their habitats are of special importance.

The dominant species of different communities of selected habitats are classified into following catagories:

A. Hydrophytic vegetation.

B. Vegetation along banks of rivers and canals.

C. Vegetation along road sides and railway-lines.

D. Wall flora.

E. Dendrophilous plants.

F. Ground flora of orchards.

G. Parasites.

H. Weeds of cultivated fields.

A. HYDROPHYTIC VEGETATION:

With onset of 'monsoon' the ponds, ditches, puddles, temporary marshy depressions get enriched with water. Hydrophytic vegetation of the area can be discussed according to association types. The following association types may be recognized:

I. Free Floating Hydrophytes:

These are in contact with water and air only and are

represented by *Eichhornia crassipes* (Mart.) Solms., *Spirodela polyrrhiza* (Linn.) Schleid. and *Trapa natans* Linn. var. *bispinosa* (Roxb.) Makino.

II. Suspended Hydrophytes:

These are rootless submerged hydrophytes and are in contact with water only. These are represented by *Ceratophyllum demersum* Linn., *Utricularia aurea* Lour.

III. Submerged Attached Hydrophytes:

These are in contact with soil and water only. The common plants of this category are: *Aponogeton natans* (Linn.) Engl. & Krause, *Hydrilla verticillata* (Linn. f.) Royle, *Ottelia alismoides* (Linn.) Pers., *Nechamandra alternifolia* (Roxb.) Thwaites, *Potamogeton nodosus* Poir. *Vallisneria spiralis* Linn. etc.

IV. Floating Leaves Attached Hydrophytes:

They are in contact of soil, water as well as air. Such plants occur in shallow water. Common plants of this category are: *Aponogeton natans* (Linn.) Engl. & Krause, *Nelumbo nucifera* Gaertn., *Nymphaea nauchali* Burm. f., *Nymphaea stellata* Willd.

V. Floating Shoots Attached Hydrophytes:

These are rooted in muddy soil with their floating shoots on water surface and are in contact with soil, water and air. The

common species of this category are: *Ipomea aquatica* Forsk., *Ludwigia adscendens* (Linn.) Hara etc.

VI. Emerged Hydrophytes:

The lower parts of the stem and often the lower leaves are submerged in water. The common species of this category are: *Aeschynomene indica* Linn., *Ammannia difformis* Linn., *Eleocharis dulcis* (Burm. f.) Henscnel, *Hydrolea zeylanica* (Linn.) Vahl. Symb., *Ipomea fistulosa* Mart., *Polygonum glabrum* Willd., *Scirpus corymbosus* Rottb. etc.

VII. Wetland Hydrophytes:

The plant of this group are generally found on soil saturated with water. The common plants are: *Asteracantha longifolia* (Linn.) Nees, *Bacopa monnieria* (Linn.) Wettst. *Cyperus aristatus* Rottb., *Eclipta prostrata* Linn., *Limnophila indica* (Linn.) Druce, *Oenanthe javanica* (Bl.) DC., *Ranunculus sceleratus* Linn. *Rumex dentatus* Hook. f., Non Linn., *Sagittaria sagittifolia* Linn. and *Typha angustata* Bory & Chaub.

B. VEGETATION ALONG THE BANKS OF RIVER AND CANAL:

During the 'monsoon' the rivers and canals assume violent appearances and bring down a lot sill which raise their beds. A number of plants are met with along the sandy beds of rivers and canals. With the advent of winter all the open grounds get covered again by herbaceous plants. Some of the common weeds

present during winter season are:

Ageratum conyzoides Linn.,

Asteracantha longifolia (Linn.) Nees,

Alternanthera polygonoides (Linn.) R.Br. ex Roem. & Schult.,

Bacopa monnieri (Linn.) Penn.,

Caesulia axillaris Roxb.,

Cynodon dactylon (Linn.) Pers.,

Cyperus brevifolius (Rottb.) Hassk.,

Eleocharis palustris R. Br.,

Imperata cylindrica (Linn.) P. Beauv.,

Limnophila indica (Linn.) Druce,

Mazus pumilus (Burm. f.) Steen.,

Ranunculus sceleratus Linn. and

Rumex dentatus Hook. f., Non Linn.

During the period of summer season the vegetation is poorly represented some of the common plants found on the edge of sandy beds are:

Argemone mexicana Linn.,

Croton bonplandianum Baillon,

Scoparia dulcis Linn.,

Verbascum chinensis (Linn.) Santap.,

Veronica angallis-aquatica Linn.

Some of the common plants which show their occurrance in shallow water and along river margin are:

Cyperus alopecuroides Rottb.,

Hydrilla verticillata (Linn.) f. Royle.,

Polygonum glabrum Willd.,

Polygonum plebeium R. Br.,

Potamogeton nodosus Poir.,

Sagittaria sagittifolia Linn. and

Scirpus mucronatus Linn.

C. VEGETATION ALONG ROAD SIDES AND RAILWAY-LINES:

Many trees have been planted along the road sides and railway tracks. Such common plants are:

Alstonia scholaris (Linn.) R. Br.,

Artocarpus heterophyllus Lamk.,

Artocarpus lakoocha Roxb.,

Azadirachta indica A. Juss.,

Bombax ceiba Linn.,

Cassia fistula Linn.,

Delonix regia (Boj. ex Hook.) Ref.,

Dalbergia sissoo Roxb.,

Ficus benghalensis Linn.,

Ficus religiosa Linn.,

Ficus virens Ait.,

Madhuca longifolia var. *latifolia*

Mangifera indica Linn.,

Syzygium cumini (Linn.) Skeels,

Tamarindus indica Linn. and

Tectona grandis Linn.

The common weed found along the road side, railway tracks and canals are:

Achyranthes aspera Linn.,

Ageratum conyzoides Linn.,

Anisomeles indica (Linn.) O. Kuntze,

Argemone mexicana Linn.,

Cassia occidentalis Linn.,

Cassia tora Linn.,

Cassia sophera Linn.,

Cleome viscosa Linn.,

Clerodendrum viscosum Vent.,

Commelina benghalensis Linn.,

Croton bonplandianum Baillon,

Cynodon dactylon (Linn.) Pers.,

Cynoglosum lanceolatum Forsk.,

Dichanthium annulatum (Forssk.) Stapf.,

Euphorbia hirta Linn.,

Evolvulus alsinoides (Linn.) Linn.,

Heliotropium indicum Linn.,

Heteropogon contortus (Linn.) P. Beauv. ex Roem. & Schult.,

Indigofera tinctoria Linn.,

Leonotis nepetaefolia (Linn.) W. Ait.,

Malvastrum coromandelianum (Linn.) Gareke,

Ocimum americanum Linn.,

Peristrophe bicalyculata (Retz.) Nees,

Sida cordata (Burm. f.) Bross.,

Solanum surattense Burm. f.,

Tephrosia purpurea (Linn.) Pers.,

Tribulus terrestris Linn.,

Triumfetta pentandra A. Rich. and

Xanthium strumarium Linn.

D. WALL FLORA:

A number of plants have been noted to be associated with semi-demolished and walls of the old buildings. Such plants which grow either at the top of the building or in wall crevics are:

Achyranthes aspera Linn.,

Boerhavia diffusa Linn.,

Blumea lacera (Burm. f.) DC.,

Commelina benghalensis Linn.,

Dactyloctenium aegyptium (Linn.) P. Beauv.,

Euphorbia hirta Linn.,

Euphorbia thymifolia Linn.,

Evolvulus alsinoides (Linn.) Linn.,

Ficus benghalensis Linn.,

Ficus relegiosa Linn.,

Ficus virens Ait.,

Heleotropium strigosum Willd.,

Lindenbergia indica (Linn.) O. Kuntze,

Nepeta hindostana (Roth.) Haines,

Oplismenus burmannii (Retz.) P. Beauv.,

Peristrophe bicalyculata (Retz.) Nees,

Portulaca oleracea Linn.,

Setaria glauca P. Beauv.,

Trianthema partulacastrum Linn. and

Ziziphus mauritiana Lamk.

E. **DENDROPHILOUS PLANTS:**

Some of the angiospermic plants show their occurrance in the forks of branches of other angiospermic plants *viz.* :

Capparis sepiaria Linn.,

Ficus benghalensis Linn.,

Ficus relegiosa Linn.,

Ficus virens Ait. and

Peristrophe bicalyculata (Retz.) Nees.

F. **GROUND FLORA OF FRUIT ORCHARDS:**

Higher humidity, diffuse sunlight cause specific habitat. A large number of weeds herbs grow in orchards, especially when these are neglected even for a short period. The common species are:

Abutilon indicum (Linn.) Sweet,

Achyranthes aspera Linn.,

Ageratum conyzoides Linn.,

Bidens pilosa Linn.,

Blainvillia acmella (Linn.) Philipson,

Boerhavia diffusa Linn.,

Cynodon dactylon (Linn.) Pers.,

Cassia occidentalis Linn.,

Cassia tora Linn.,

Clerodendrum viscosum Vent.,

Cynoglossum lanceolatum Forsk.,

Desmodium gangeticum (Linn.) DC.,

Elephantopus scaber Linn.,

Erigeron bonariensis Linn.,

Euphorbia hirta Linn.,

Imperata cylindrica (Linn.) P. Beauv.,

Nicotiana plumbaginifolia Viv.,

Oxalis corniculata Linn.,

Peristrophe bicalyculata (Retz.) Nees,

Physalis minima Linn.,

Sida cordata (Burm. f.) Bross.,

Solanum nigrum Linn. and

Urena lobata Linn.

G. PARASITES:

A number of plants show parasites habitat and depends upon other plants for getting their nutrients. Among such plants *Cuscuta reflexa* Roxb. and *Dendropthoe falcata* (Linn. f.) Etting are total partial stem parasites respectively with a wide range of host plants such as *Adhatada vasica* Nees, *Mangifera indica* Linn , *Modhuca longifolia* var. *latifolia*, *Syzigium cumini* (Linn.) Skeel, *Syzigium heynianum* and *Vitex negundo* Linn. *Orobanche aegyptica* Pers. and *Striga asiatica* (Linn.) O. Kuntze are root

parasites found on the members of Verbenaceae, Orobanchaceae and Poaceae.

H. WEEDS OF CULTIVATED FIELDS:

A number of weeds owe their presence in cultivated fields. Being agressive in nature having more viable seeds which produced in large number, they compete with the crops and affect their growth by exhausting the soil nutrients. For the sake of convenience the weeds are delt with as under:

a. Weeds Of Kharif Crop:

The common weeds which show their presence with the kharif crop are:

Catharanthus pusillus (Merr.) G. Don.,

Celosia argentea Linn.,

Cleome gynandra Linn.,

Cleome viscosa Linn.,

Cyperus tenuispica Steud.,

Cyperus pigmaeus Rottb.,

Cyperus triceps (Rottb.) Endl.,

Cyperus rotundus Linn. and

Sporobolus diander (Retz.) P. Beauv.

b. Weeds Of Paddy Crop:

Although, paddy is also included in the Kharif crop, but the weeds growing with paddy crop are quite different from those of

other "Kharif" crop. it is due to the fact that only aquatic and marshy species can thrive over with paddy crop. The common weeds of paddy crop are:

Aeschynomene indica Linn.,

Ammannia baccifera Linn.,

Bacopa monnieria (Linn.) Weitst.,

Caesulia axillaris Roxb.,

Cyperus bervifolius (Rottb.) Hassk.,

Cyperus sanguinolentus Vahl,

Dopatrium junceum (Roxb.) Buch.- Ham. ex Benth.,

Eleocharis palustris R. Br.,

Fimbristylis miliacea (Linn.) Vahl,

Hemiadelphous polyspermus (Roxb.) Nees,

Hydrolea zeylanica (Linn.) Vahl, Symb. and

Scirpus lateriflorus Gmel.

c. Weeds Of Rabi Crop:

The weeds which generally owe their presence with rabi crop are:

Anagallis arvensis Linn.,

Amaranthus viridis Linn.,

Amaranthus spinosus Linn.,

Asphodelus tenuifolius Cav.,

Carthamus oxyacantha Bieb.,

Chenopodium album Linn.,

Convolvulus arvensis Linn.,

Euphorbia hirta Linn.,

Euphorbia dracunculoides Lamk.,

Fumaria indica (Hassk.) Pugsly,

Lathyrus aphaca Linn.,

Lathyrus sativus Linn.,

Medicago lupulina Linn.,

Melilotus alba Medik.,

Melilotus indica (Linn.) All.,

Orobanche aegyptica Pers.,

Polygonum plebeium R. Br.,

Sonchus asper (Linn.) Hill.,

Solanum nigrum Linn. and

Striga asiatica (Linn.) O. Kuntze.

FACTORS AFFECTING VEGETATION

The vegetation of any area, being a part of ecosystem, comes under the direct influence of a number of biotic and abiotic factors. The response of the plant to these factors may be negative as well as positive, or in some cases a particular factor may make, different plant populations, to respond quite differently. Further, the same stimulus may evoke entirely distinct responses in different developments stages of same individual. Some such factors, which have been found to have a telling effect on the vegetation of area under study have been enumerated and described briefly in supervening paragraphs.

1. FIRE:

The vegetation may be set ablaze deliberately or this may occur accidentally. Since, Hardoi is devoid of any dense forest tract hence accidental fires, involving exclusively the vegetation, are rare. Sometimes the undergrowth in *Eucalyptus* plantations are burt down in order to do away with dicot weeds and pave the way for the establishment of grasses, to augment the fodder supply. The basal portion of *Erianthus munja* (Roxb.) Jesw., after cutting the culms, are seared to enhance the development of new shoots and remove the stumps. In the month of frost the fire is lit at places in orchards and around the fields. This practice provides a sort of smoke cover and reduce the severity of frost. But the effect of fire is not that much attractive and paying in every respect. The fire effects the pattern of vegetation in various ways. The humus of the charred

soil is carbonized, rendering the soil unsuitable for plant growth, especially the dicots. The seeds and the pertaining buds, particularly those occupying a portion just below the soil surface, perish. Such species may disappear completely or their relative density may be badly affected. It takes sometime for new seeds to come and establish. The surviving trees and shrubs loose their aesthetic value because of charred trunks and foliage. The exotic species like *Lantana camara* Linn. find it easy to establish a foot hold on burnt soil.

Interestingly, some species have develop fire resistance to sustain the hazards of recurring jungle-fire. These fire proof plants are generally characterized by a woody base that shoots up dwarf foliar immediately after the fire. *Premna herbacea* Roxb., is one such tall undershrub, to which, fire has transformed into a permanently dwarf, 3-5 cm tall, stemless herb. *Vernonia teres* Wall. ex DC., *Polygala crotalariodes* Buch -Ham. ex DC., *Desmodium* Desv., *Uraria* Desv. and *Maughania* J. St. Hil. are some of the fire-indicator plants.

2. DEMAND OF FIRE-WOOD AND TIMBER:

Wood is still the most sought after fuel. Insufficient supply of LPG (Liquid Petrolium Gas) and Kerosene has further worsened the situation. Since the time immemorial the trees have ascended the pyre to make our food palatable and the houses warm. Hardoi is not a shade different from other areas in this respect.

Forest department has been fighting a grim battle against unautherised tree fellers and has succeeded, to a great extent, in saving a large number of trees from falling prey to axe. The informal and crude knowledge of plant physiology has taught the people a way to frustrate the efforts of forest autherities and legitimize the otherwise illegitimate falling of trees. The bark of the tree along with some wood is girlded out to ensure complete disruption of food supply to the roots and then it is a cake walk to obtain the permission of the forest department to cut down a "dried up tree". In addition to this, the trees are robbed of their bark, branches and leaves. This practice hampers their growth and gives them an ugly look. Many herbs or under shrubs, which develop some amount of wood, are extensively collected and dried up in the sun to be used as a cheaper source of fuel by the lower classes. Some examples of such herbs are *Hyptis suaveolens* (Linn.) Poit., *Abutilon indicum* (Linn.) Sweet, *Malvastrus coromandelianum* (Linn.) Gareke, *Conyza stricta* Willd. *Cassia tora* Linn. and *Xanthium strumarium* Linn. etc.

Not many timber trees grow at Hardoi. But 'Sheesham' (*Dalbergia sissoo* Roxb.) and 'Mango' (*Mangifera indica* Linn.) have to suffer a lot at the hands of timber traders. *Eucalyptus* also fetches good price but because of its heavy plantation on commercial scale, a sort of equilibrium remains maintained in its case.

3. DEMAND OF FODDER:

A large section of people either earns its livelihood or augments the income by marketing products. Grass mowing is a common practice, especially on road sides and fallow lands, to fed cows, buffaloes and goats. The practice not only cuts off the plants in the prime of life and reduces the chances of seed setting but also leaves the soil uncovered and unbainded making it vulnerable to erosion agents.

The branches of many trees like 'Mango' (*Mangifera indica* Linn.), 'Jamun' [*Syzygium cumini* (Linn.) Skeel], 'Beri' [*Zizyphus oenoplia* (Linn.) Mill.], 'Gooler' (*Ficus racemosa* Linn.) and 'Imli' (*Tamarindus indica* Linn.) etc. are lopped off to feed the sheep and goats.

4. CONSTRUCTIONS:

With the increasing population the cities and towns are expanding horizontally. New colonies are coming up at a rapid pace. This factor have also damaged the natural vegetation tremendously.

5. ANIMAL AND BIRDS:

The relationship between these groups and the plants is as old as their history. The plants are benefitted by such acts of animals as assistance in pollination, feeding on harmful insects and help in dissemination of seeds. Humming birds, honey bees and

butter-flies are common pollinating agents. But the losses, the plants suffer due to undesirable activities of some member of insects such as Green paddy leaf hopper (*Nephotettix apicalis* Motsch.), sugarcane leaf hopper (*Pyrilla perpusilla* Walk.), Red pumpkin beetle (*Aulacophora foveicollis* Lucas) and pomogranate butterfly (*Virachola isocrates* Fabr.) causes extensive damage to commercial crops. Many birds feed on seeds and seedlings. The sparrow especially relieshes the seedlings of Spinach (*Spinacia oleraceas* Linn.). Parrots, redvented Bulbul, Squirrels and Bats use to snip the ripe fruits and clip off the unripe ones. The Vultures have earned the disreputation of converting the tree, they use to sit on, and the vegetation under it into mere skeleton. Their droppings cause severe burnings of the leaves and after sometime only branches are left.

6. POLLUTION:

There is a network of small industries at Hardoi such as brick-klins, lime-klins and crushers along with many others. Coal is the main fuel used in brick-klins, while cane crushers normally burn bagasse to boil the juice. Combustion of both these types of fuel results in the formation of oxides of carbon, sulphur and nitrogen as well as particulate matter. These pollutants may settle down immediately near the source or may be carried over to long distances, depending upon atmospheric conditions. The effect of these hazardous substances has been observed to manifest itself in the form of different visual

symptoms for instance chlorisis, necrosis, scorching, burning, curling of leaves and stunted growth. The ashes removed from the industries are dumped in nearby areas. The physical and chemical properties of the soil of these dumping sites and the vegetation growing thereon alter to a great extent. The pollution sensitive species retreat from such places and the advancement of resistant species starts. This process changes the picture of vegetation significantly after some time. The affluent from the some factories are used as liquid mannure. It not only cuts down the expenditure on irrigation and manuring but also increases the yield.

ANALYSIS OF VEGETATION

Present Chapter deals with a brief and simple analysis of vegetation of Hardoi tehsil. Such an analysis gives an opportunity to determine not only the contribution of different classes, serieses and families to the total vegetation, but also help to understand as to plants habits are dominant. The families listed as dominant are likely to be dotted about in the area, provided favourable conditions for plant growth are available.

1. TOTAL NUMBER OF FAMILIES AND CONTRIBUTION OF HIGHER TAXA AT FAMILY LEVEL:

The vegetation of Hardoi is spread over 127 families in all. Out of this number, 101 families are of dicot origin and remaining 26 belong to Monocotyledoneae. Thus, at family level dicot alone account for more than 79% of total flora and monocots for less than 21%. Further, among dicot there are 56 polypetalous families (55%), 28 gamopetalous families (28%) and 17 monochlamydous (17%). It is clearly reveals that the contribution of Polypetalae is more than 50% of total dicot flora and nearly 45% of total flora. Among monocots, the Glumaceae emerge as the major shareholder contributing as much as 59% of total monocot flora.

2. DOMINANT FAMILIES:

There may be two criteria to determine the dominance of a given family. To take into account the total number of representative species or to consider the total number of representative genera. On the basis of first criterion 13

families stake out their claims for first ten places (*Table 1*). Poaceae top the list followed by Fabaceae, Asteraceae and Cyperaceae. Eighth position is held by Cucurbitaceae while tenth jointly by Brassicaceae and Apocynaceae.

Table 1

Comparision of Dominant Families of Hardoi, Upper Gangetic Plain and British India.

S. No.	Hardoi	Upper Gangetic Plain (After Hooker, f. 1904)	British India (After Hooker, f. 1904)
1.	Poaceae	Poaceae	Orchidaceae
2.	Fabaceae	Leguminosae	Leguminosae
3.	Asteraceae	Cyperaceae	Poaceae
4.	Cyperaceae	Asteraceae	Rubiaceae
5.	Euphorbiaceae	Scrophulariaceae	Euphorbiaceae
6.	Scrophulariaceae Acanthaceae	Malvaceae	Acanthaceae
7.	Solanaceae Malvaceae	Acanthaceae	Asteraceae
8.	Cucurbitaceae	Euphorbiaceae	Cyperaceae
9.	Convolvulaceae	Convolvulaceae	Lamiaceae
10.	Brassicaceae Apocynaceae	Lamiaceae	Urticaceae

First two places are in agreement with the flora of Upper Gangetic Plain. But, Cyperaceae which rank as high as third in Upper Gangetic Plain descend to fourth position in this area. Rest of the families are similar with some positional alterations.

As far as Indian Flora is concerned, the Poaceae rank the third but at Hardoi same family enjoy the previlage of first position. Orchidaceae to the flora of Hardoi is quite insignificant, while this is at top in the Indian Flora. Asteraceae, occupying seventh position in Indian Flora, jump to third position at Hardoi.

3. **HERBS:**

Total herbaceous flora (including hydrophytes and parasites) amounts to 464 species (62.53% of total flora). Out of this 336 species (72.52%) are dicot and 128 species (27.48%) are monocot. Among dicot the Thalamiflorae are represented by 74 species (21.96%), Disciflorae by 9 species (2.67%), Calyciflorae by 67 species (19.88%), Inferae by 67 species (15.13%), Heteromerae by 3 species (0.89%), Bicarpellatae by 87 species (25.82%) and Monochlamydae by 46 species (13.65%). The Thalamiflorae and Bicarpellatae, together account for nearly 48% of total herbaceous flora.

The contribution of Poaceae alone to monocot herbaceous flora is 45.31% (58 species). Sedges come next with 26 species (20.31%). Thus, Glumaceae alone (including one species of *Eriocaulon*) contributed 66.40% of total monocot flora. Remaining 33.60% herbs are shared by 23 families.

Five major herbaceous families are Poaceae (58 species),

Asteraceae (47 species), Fabaceae (35 species), Cyperaceae (26 species) and Euphorbiaceae (20 species). The contribution of Scrophulariaceae (18 species), Brassicaceae (15 species), Amaranthaceae (14 species) and Acanthaceae (13 species) represented by no more significant.

4. SHRUBS:

There are 98 shrubs in all (13.21% of total flora). As many as 94 species are dicotyledonous (95.91% of total shrubs) and only 4 species (4.09%) are monocot. Among dicot the contribution of Thalamiflorae 19.15% (18 species), Disciflorae 5.32% (5 species), Calyciflorae 24.47% (23 species), Inferae 5.32% (5 species), Heteromerae 1.06% (1 species), Bicarpellatae 29.78% (28 species) and Monochlamydae 14.89% (14 species). The major shrubby families are Fabaceae and Malveceae (9 species each), Acanthaceae (8 species), Rubiaceae and Verbinaceae (7 species each).

5. TREES:

There are 123 arborescent species (16.58% of total flora). 119 species (96.74%) belong to Dicotyledonae and remaining 4 species (3.26%) belong to Monocotyledonae. The Thalamiflorae contribute 14.28% (17 species), Disciflorae 5.88% (7 species), Calyciflorae 37.81% (45 species), Inferae 3.36% (4 species), Heteromerae 2.52% (3 species), Bicarpellatae 16.80% (20 species) and Monochlamydae 19.32% (23 species). Major families contri-

buting to arboreal flora are Mimosaceae and Moraceae (9 species each), Caesalpiniaceae and Rutaceae (7 species each), Apocynaceae and Myrtaceae (6 species each).

6. CLIMBERS:

57 species exhibit climbing habit (7.68% of total flora). 51 species (89.47%) are of dicot origin and remaining 6 species (10.53%) of monocot origin. Among dicots the contribution of Thalamiflorae is 7.84% (4 species),Disciflorae 9.80% (5 species), Calyciflorae 39.21% (20 species), Bicarpellatae 35.29% (18 species) and Monochlamydae 7.84% (4 species). Major families with Climbers are Fabaceae and Convolvulaceae (9 species each), Cucurbitaceae (8 species), Bignoniaceae and Liliaceae (3 species each).

7. HYDROPHYTES:

The hydrophytic flora is not very much rich. Only 24 species (3.34% of total flora) inhibit the water bodies of the area. Only 3 species (37.50%) come from dicot families and 15 species (62.50%) from monocot families.

8. PARASITES:

Only 4 species (0.53% of total flora) parasitize other angiospermic species and all of them are dicotyledonous.

9. MEDICINAL PLANTS:

There are 181 species (32.26% of total flora) of medicinal

plants. 169 species (93.37%) are of dicot origin and remaining 12 species (6.63%) of monocot origin.

10. RELATIVE REPRESENTATION OF FAMILIES AND GENERA:

Out of 127 families found in this area, 59 families (46.45%) are represented by only one genus each, 43 families (33.85%) are represented by 2-5 genera each, 18 families (14.17%) are by 6-10 genera each, 3 families (2.36%) are represented by 11-15 genera each and 4 families more than 15 genera each.

As many 398 genera (77.15%), out of 515, have only one species, 108 genera (21.09%) are represented by 2-5 species, 7 genera (1.36%) possess 6-10 species and only 2 genera (0.39%) are represented by more than 10 species.

11. GENUS SPECIES RATIO:

Genus species ratio for this area has been calculated as 1:1.44 against 1:2.2 for Upper Gangetic Plain and 1:7 for British India Flora.

SUMMARY

Present thesis embodies the results of systematic studies with special reference to medicinal plants, carried out over a period of five years, on angiospermic flora of Hardoi District (tehsil). This tehsil, situated between 26° 53' and 27° 47' North and 79° 41' and 80° 49' East, is stretched over an area of 6012 Sq. Kms. It is one of the four tehsils which constitute Hardoi district of Central U.P.

The entire thesis runs into 11 Chapters, viz. (1) Introduction, (2) Hardoi tehsil, (3) Climate, (4) Plan of work and present study, (5) Vegetational composition, (6) Vegetation of special habitat, (7) Factors effecting vegetation, (8) Analysis of vegetation, (9) Summary, (10) Systematic treatment of flora and (11) Selected bibliography.

First 9 Chapters are general and deal with a brief discussion of relevant aspects pertaining to the area under study. Maps and graphical figures have been incorporated in second and third Chapters to illustrate the geographical position and climate of the tehsil. Eigth Chapter deals with a simple statistical analysis of entire flora. Analysis has been done from various angles. This will help to perceive a picture of composition of vegetation in terms of percentage contribution of different major and minor taxonomic groups.

Systematic portion starts with a comprehensive analytical synopsis of the families. Attempts has been made to cover as many

The families have been arranged in accordance with the system of Bentham and Hooker. But, as far as the circumscription of families is concerned, modern concepts have been followed. Each family, having more than one genus except most of the cultivated ones, start with a dentated key to genera. This is followed by treatment of individual genus and species. Where a genus is represented by more than one species, a key to the species has been incorporated. The keys are based on easily visible morphological and field characters. For each species the correct name has been given first, followed by basionym, if any, and other synonyms. A short description is given in each case to ascertain the identity. At few places, notes on distinguishing characters have been given. The medicinal utility of plants, if any, with useful plant parts and disease in which the drugs are used, also given. Flowering and fruiting period, followed by local name only in the case of medicinal species, place of collection and field book numbers have been indicated for each species, except most of the cultivated species.

In all, 742 species belonging to 515 genera spread over 127 families have been treated systematically. A brief resume of vegetation is given at the end of this chapter under the headings "Vegetation at a glance".

VEGETATION AT A GLANCE

A. TAXONOMICAL ANALYSIS:

S. No.	TAXA	DICOT	MONOCOT	TOTAL
1.	Families	101	26	127
2.	Genera	415	100	515
3.	Species	600	142	742

Genus Species ratio	:	1:1.44
Monocot-Dicot ratio	:	1:3.88
Number of families with 1 genus	:	59
Number of families with 2-5 genera	:	43
Number of families with 6-10 genera	:	18
Number of families with 11-15 genera	:	3
Number of families with more than 16 genera	:	4
Number of genera with 1 species	:	398
Number of genera with 2-5 species	:	108
Number of genera with 6-10 species	:	7
Number of genera with above 10 species	:	2

B. HABIT-WISE ANALYSIS:

S. No.	HABIT	DICOT	MONOCOT	TOTAL	% of TOTAL FLORA
1.	Herbs	336	128	464	62.53
2.	Shrubs	94	4	98	13.21
3.	Trees	119	4	123	16.58
4.	Climbers	51	6	57	7.68

C. MEDICINAL PLANT ANALYSIS:

DICOT	MONOCOT	TOTAL	% of TOTAL FLORA
169	12	181	32.26

SYSTEMATIC TREATMENT OF FLORA

GENERAL KEY TO THE FAMILIES

Leaves mostly with reticulate venation; flowers 4 - 5-merous, rarely 3-merous; seeds with 2 cotyledons.....I. **DICOTYLEDONS**

Leaves mostly with parallel venation; flower three-merous; seeds with one-cotyledons.....II. **MONOCOTYLEDONS**

I. DICOTYLEDONS

Flowers dichlamydeous:

Petals free.....A. **POLYPETALAE**

Sepals mostly distinct and free; ovary superior:

Thalamus well developed, often in the form of torus.....(i) **Thalamiflorae**

Thalamus expended, usually in the form of prominent disk.....(ii) **Disciflorae**

Sepals connate, rarely free; ovary usually inferior.....(iii) **Calyciflorae**

Petals connate.....B. **GAMOPETALAE**

Ovary inferior.....(i) **Inferae**

Ovary superior:

Carpels more than two.....(ii) **Heteromerae**

Carpels two..... .....(iii) **Bicarpellatae**

Flowers monochlamydeceous.....C. **MONOCHLAMYDEAE**

A. POLYPETALAE

(i) Thalamiflorae

Carpels many, mostly apocarpous, rarely connate; stamens usually numerous:

Amphibious or terrestrial:

Amphibious herbs or climbing shrub; anthers adnate.....I. **Ranunculaceae**

Terrestrial; trees or shrubs:

Fruit enclosed in thickened and enlarged sepals.....II. **Dilleniaceae**

Fruit not enclosed in thickened and enlarged sepals:

Stipules convolute leaving annular scar on petiole.....III. **Magnoliaceae**

Stipules none.....IV. **Anonaceae**

Aquatic plants:

Carpels sunk in the receptacle and adnate to it forming a many celled ovary.....VI. **Nymphaeaceae**

Carpels sunk in the apex of an elongated receptacle.....VII. **Nelumbonaceae**

Carpels few, usually three, apocarpous; stamens fewer:

Twinners or scandent shrubs; flowers usually 3-merous.....V. **Menispermaceae**

Carpels usually 2-8, syncarpous:

Gynophore none:

Placentation parietal:

Laticiferous herbs; sepals 2-3, very caducous.....VIII. **Papaveraceae**

Non-laticiferous herbs:

Sepals 2-4:

Sepals two; stamens two, tripartite.....IX. **Fumariaceae**

Sepals four; stamens six, tetradynamous.....X. **Brassicaceae**

Sepals 4-5:

Sepals 4-5;stamens 5-many, polyandrous.....XIII. **Flacourtiaceae**

Sepals 5; stamens usually ten or less by reduction, variously adnate:

Shrubs or small trees;
seeds pilose.....XVII. **Tamaricaceae**

Herbs; seeds strophiolate.....XIV. **Polygalaceae**

Petals usually spurred; fruit three-valved loculicidal capsule.....XII. **Violaceae**

Petals three, contorted, stamens many:

Fruit indehiscent one-celled, resinous tree....XIX. **Dipterocarpaceae**

Gynophore usually present; mostly spinescent shrubs or small trees.....XI. **Capparaceae**

Placentation free-central:

Sepals 2; leaves fleshy; flowers solitary terminal or fascicled...XVI. **Portulacaceae**

Sepals five; leaves not fleshy; flowers in dichasial cyme.....XV. **Caryophyllaceae**

Placentation axile:

Stamens usually connate:

Stamens monadelphous:

Anthers 1-celled.....XX. **Malvaceae**

Anthers 2-celled.....XXII. **Sterculiaceae**

Stamens polyadelphous.....**XXI.** **Bombacaceae**

Stamens free:

Stamens 5.....**XVIII.** **Elatinaceae**

Stamens usually 15 or more....**XXIII.** **Tiliaceae**

Stamens many in several series; resinous tree.....**XIX.** **Dipterocarpaceae**

A. POLYPETALAE

(ii) Disciflorae

Flowers in leaf-opposed cymes or panicles; climbing shrubs.....**XXXV.** **Vitaceae**

Flowers not leaf-opposed:

Leaves simple:

Flowers zygomorphic; dorsal sepal spurred:

Leaves peltate; one ovule in each cell.....**XXVII.** **Tropaeolaceae**

Leaves not peltate; many ovules in each cell.....**XXVIII.** **Balsaminaceae**

Flowers sub-zygomorphic or actinomorphic; dorsal sepal not spurred:

Unarmed herbs.....**XXIV.** **Linaceae**

Usually armed undertrees or climbing shrubs:

Leaves often with strong basal nerves, oblique. Fruit indehiscent, rarely winged.....XXXIV. **Rhamnaceae**

Leaves not as above. Fruit various; seeds usually arillate.....XXXIII. **Celastraceae**

Leaves compound:

Flowers actinomorphic; sepals not spurred.....XXVI. **Oxalidaceae**

Flowers usually irregular; style simple or sometimes bifid above.....XXXVI. **Sapindaceae**

Flowers usually regular; style two to five.....XXX. **Simarubaceae**

Flowers actinomorphic:

Leaves gland-dotted.....XXIX. **Rutaceae**

Leaves not gland-dotted:

Stamens monadelphous.....XXXII. **Meliaceae**

Stamens polyandrous:

Leaves exstipulate:

Leaves 2-foliate.....XXXI. **Balanitaceae**

Leaves simple.....XXXVII. **Anacardiaceae**

Leaves stipulate.....XXV. **Zygophyllaceae**

Flowers zygomorphic.....XXXVIII. **Moringaceae**

A. POLYPETALAE

(iii) Calyciflorae

Ovary usually superior, sometimes half inferior:

Fruit a legume:

Flowers zygomorphic:

Corolla papilionaceous; stamens ten, monadelphous or diadelphous.....**XXXIX.** **Fabaceae (Papilionaceae)**

Corolla not as above; stamens ten, polyandrous, some reduced to staminodes.....**XL.** **Caesalpiniaceae**

Flowers actinomorphic; stamens 4-many, polyandrous.....**XLI.** **Mimosaceae**

Fruit not a legume:

Non-lactiferous plants.....**XLII.** **Rosaceae**

Lactiferous small trees; fruit a large berry.....**LII.** **Caricaceae**

Fruit capsular or indehiscent cocci; generally 3-5-valved capsule.....**LIII.** **Molluginaceae**

Ovary mostly inferior or half-inferior:

Leaves none or much reduced;succulent plants with phylloclades.....**L.** **Cactaceae**

Leaves not as above, well developed:

Plants with tendrils:

Ovary seated on gynophore; corona often present; petals 5 or none.....LI. **Passifloraceae**

Ovary not seated on gynophore; corona none; petals some times connate.....XLIX. **Cucurbitaceae**

Plants without tendrils:

Aquatic plants;fruit drupaceous, bony or spinescent.....XLVIII. **Trapaceae**

Terrestrial plants:

Flowers in simple or compound umbels; fruit a cremocarp.....LV. **Apiaceae**

Flowers in axillary or terminal cymes; fruit drupaceous.....LVI. **Alangiaceae**

Flowers neither in umbels nor in axillary or terminal cymes:

Calyx-tube free from ovary:

Petals present (rarely absent), crumpled in bud; ovary 2-6-celled.....XLV. **Lythraceae**

Petals none; ovary one to two celled.....LIV. **Aizoaceae**

Calyx-tube adnate to ovary:

Stamens numerous:

Leaves usually gland-dotted; fruit berry, drupaceous or capsule...**XLIV.** **Myrtaceae**

Leaves not gland-dotted; fruit a globose berry or capsule often crowned with persistent calyx lobes.....**XLVI.** **Punicaceae**

Stamens definite:

Stamens 1Ø, ovary one-celled; fruit often winged or angular, drupaceous.....**XLIII.** **Combretaceae**

Stamens 8, ovary usually 2-6 celled; fruit not winged, berry or capsule.....**XLVII.** **Onagraceae**

B. GAMOPETALAE

(i) Inferae

Ovary always inferior:

Anthers free:

Leaves stipulate; inter- or intra-

petiolar; herbs, shrubs or trees....LVII. **Rubiaceae**

Leaves exstipulate,herbs or shrubs:

Amphibious herbs; flowers in dense spikes;capsule circumscissile, apical portion falling off as a lid.....LX. **Sphenocleaceae**

Terrestrial herbs; flowers in axillary or terminal racemes or panicles, sometimes solitary; fruit a berry or capsule, often crowned with persistent calyx lobes.....LIX. **Campanulaceae**

Anthers connate;flowers in capitulum; ovary 1-celled.....LVIII. **Asteraceae**

B. GAMOPETALAE

(ii) Heteromerae

Ovary superior; carpels usually more than two:

Trees or large shrubs:

Leaves gland-dotted;ovules on free central placenta.....LXIII. **Myrsinaceae**

Leaves not as above; ovules on axile placenta:

Flowers mostly dioecious; milky juice none.....LXV. Ebenaceae

Flowers mostly bisexual, some times polygamous; milky juice often present.....LXIV. **Sapotaceae**

Herbs or undershrubs

Style 1; sepals glabrous.....LXII. **Primulaceae**

Style 5; sepals often with glandular hairs.....LXI. **Plumbaginaceae**

B. GAMOPETALAE

(iii) Bicarpellatae

Ovary superior or half inferior;carpels usually two:

Flowers actinomorphic:

Laticiferous plants:

Anthers mostly sagittate; pollinia none.....LXVII. **Apocynaceae**

Anthers not as above; pollinia present.....LXVIII. **Asclepiadaceae**

Non-laticiferous plants:

Stamens usually two.....LXVI. **Oleaceae**

Stamens 4-5:

Small trees or shrubs; ovary usually 2-celled,ovules many in each cell.....LXIX. **Buddlejaceae**

Herbs or shrubs,rarely small tree:

Placentation parietal; ovary 1 to 2 celled with many ovules.....**LXX. Gentianaceae**

Placentation axile:

Twinning herbs or shrubs or erect herbs:

Flower in scorpioid cymes, rarely solitary; erect hispid herbs.....**LXXII. Boraginaceae**

Flowers solitary or few flowered cymes; twinners.....**LXXIII. Convolvulaceae**

Erect herbs, shrubs or small trees:

Ovules on swollen placenta.....**LXXIV. Solanaceae**

Ovules not on swollen placenta.....**LXXI. Polemoniaceae**

Flowers zygomorphic:

Insectivorous, aquatic herbs with bladders.....**LXXVII. Lentibulariaceae**

Plants not as above:

Parasitic herbs.....LXXVI. Orobanchaceae

Non-parasitic plants:

Seeds mostly winged.....LXXVIII. Bignoniaceae

Seeds not winged:

Bract and bracteoles distinct; anthers sometimes apiculate.....LXXXI. Acanthaceae

Bract & bracteoles inconspicuous or none:

Pedicels biglandular:

Fruit beaked; many ovules on axile placenta.....LXXIX. Pedaliaceae

Fruits horned with distinct claws; few to many ovules on parietal placenta....LXXX. Martyniaceae

Pedicels not as above:

Ovules one to two in each cell:

Flowers usually in verticellaster; ovary four-

lobed; style gynobasic.....**LXXXIII. Lamiaceae**

Flowers in terminal or axillary racemes, cymes or spikes; ovary usually entire, style terminal....**LXXXII. Verbenaceae**

Ovules numerous in each cell.....**LXXV. Scrophulariaceae**

ANOMALOUS FAMILY

Leaves radical, usually in rosette; flowers in axillary peduncled spikes or heads.....**LXXXIV. Plantaginaceae**

C. **MONOCHLAMYDEAE**

Ovary inferior:

Hemiparasitic plants; ovary 1-celled, 1-ovuled.....**XCIII. Loranthaceae**

Non-parasitic, climbing plants; ovary 4-6 celled; ovules many in two-series in each cell.....**XC. Aristolochiaceae**

Ovary superior:

Flowers mostly bisexual, sometimes polygamous:

Leaves mostly with ochreate stipule.**LXXXIX. Polygonaceae**

Leaves exstipulate or if present; membranous:

Climber; bracts apiculate, perianth fleshy.....**LXXXVIII. Basellaceae**

Herbs or shrubs; perianth lobes 2-5, sometimes none:

Perianth lobes none;stipules membranous; fruit a berry or drupe.....**XCI. Piperaceae**

Perianth lobes two to five, bract-like:

Bracts and perianth scarious; ovule 1-many.....**LXXXVI. Amaranthaceae**

Bracts usually none,other wise bracts not scarious; ovule always solitary.....**LXXXVII. Chenopodiaceae**

Perianth lobes 4-5,not bract like. Bracts often showy.....**LXXXV. Nyctaginaceae**

Tree;leaves incised and silvery beneath; flowers orange secund in racemes.....**XCII. Proteaceae**

Trees having scarious leaves; branchlets cylindrical, longitudinally ribbed;fruit a samara

aggregated into woody cone-like structure.....XCIX. Casuarinaceae

Flowers unisexual or polygamous:

Flowers in catkins or spikes or hypanthodium:

Ovule pendulous or erect:

Filaments inflexed or erect in bud:

Trees with milky juice; fruit usually multiple.....XCVI. Moraceae

Trees without milky juice fruit a winged samara or drupaceous.....XCVII. Ulmaceae

Filaments inflexed in bud:

Plant often with stinging hairs; fruit a dry achene or drupaceous.....XCV. Urticaceae

Plants without stinging hairs; often strong smelling; fruit an achene.....XCVIII. Cannabinaceae

Ovules on parietal or basal placenta, leaves well developed; fruit 2-4-valved capsule.....C. Salicaceae

Flowers not catkins or spikes or hypanthodium:

Aquatic submerged herb; carpels with solitary pendulous ovule....CI. **Ceratophyllaceae**

Terrestrial herbs, shrubs or trees, mostly with milky sap; carpels 3 with 1-2 ovules in each cell.....XCIV. **Euphorbiaceae**

II. MONOCOTYLEDONS

Flowers in the axile of chaffy or scaly bracts (Glumes),perianth reduced; ovary superior, 1-locular, 1-ovuled:

Leaves 2-ranked; clums terete.....CXXVII. **Poaceae**

Leaves 3-ranked; clums 3-angled.....CXXVI. **Cyperaceae**

Flowers not as above; perianth well developed or none:

Ovary superior, some times partly inferior:

Carpels 2-many, apocarpous:

Perianth-segments 6, 2-seriate..CXXI. **Alismataceae**

Perianth-segments 3, sepaloid or none:

Carpels 3-6; ovary with 2 or more ovules; fruit a beaked follicle.....CXXII. **Aponogetonaceae**

Carpels four; ovary with

solitary ovule; fruit a nut-
let or drupelet (drupe).....**CXXIII. Potamogetonaceae**

Perianth-segments none or much reduced:

Aquatic plants with linear leaves or leaves undifferentiated:

Free-floating frond-like aquatic plants; fruit an urticle.....**CXX. Lemnaceae**

Submerged aquatic herbs with creeping rhizome; fruit an achene.....**CXXIV. Zannichelliaceae**

Marshy plants with broad-linear, spongy two-ranked leaves; flowers unisexual in densely crowded spikes.....**CXVIII. Typhaceae**

Woody shrubs or small trees, often with stilt roots. Leaves spinose; flowers unisexual, fragrant.....**CXVII. Pandanaceae**

Perianth-segments sepaloid or petaloid:

Herbaceous plants with grass like leaves;flowers in terminal panicle or corymbose.....**CXV. Juncaceae**

Trees, erect or climbing shrubs:

Leaves palmately or pinnately lobed; flowers in large spadix.....CXVI. **Arecaceae**

Leaves thick,densely tufted (radical); flowers in large panicles often replaced by bulbils.....CX. **Agavaceae**

Perianth segments 6, 2-seriate, inner one petaloid:

Stamens usually 3 or 6 or fewer by abortion:

Aquatic herbs with creeping or floating rhizome...CXIII. **Pontederiaceae**

Terrestrial plants:

Leaves without basal closed sheath; leaves with parallel venation flowers hermaphrodite, rarely unisexual;plant without prickles.....CXII. **Liliaceae**

Leaves with closed sheath:

Flowers in fleshy spadix.....CXIX. **Araceae**

Flowers in monochasial cymes, often cleistogamous.....CXIV. **Commelinaceae**

Ovary inferior:

Aquatic submerged herbs.....CII. **Hydrocharitaceae**

Terrestrial or sometimes epiphytic plants:

Flowers zygomorphic; perianth distinguished into calyx and corolla. Fertile stamens one or rarely 5 or 6:

Placentation parietal; ovary 1-celled, spirally twisted; stamen 1, pollinia present; filaments adhere to style to form gynostemium.....CIII. **Orchidaceae**

Placentation axile; ovary 3-celled,not spirally twisted; stamen 1-6. Pollinia none:

Inner perianth zygomorphic. Fertile, stamens 5-6; staminodes usually absent.....CIV. **Musaceae**

Inner perianth actinomorphic. Stamen 1; staminodes present, showy:

Anthers 2-celled; style tightly held between anther cells.....CV. **Zingiberaceae**

Anthers 1-celled; style quite free, stamen flat.....CVI. **Cannaceae**

Flowers actinomorphic, rarely sub-zygomorphic; perianth more or less alike, petaloid. Stamens six or 3:

Flowers unisexual. Dioecious twinners with leafy stems.....CXI. **Dioscoriaceae**

Flowers bisexual. Not twinners, stems with radical leaves:

Inflorescence scapose, umbellate; flowers with a spathaceous bract.....CIX. **Amarylidaceae**

Inflorescence radical:

Perianth-segments free to the base.....CVII. **Iridaceae**

Perianth-segments connate at the base.....CVIII. **Bromeliaceae**

Flowers unisexual; leaves radical; perianth-segments hyaline, free to the base.....CXXV. **Eriocaulaceae**

I. RANUNCULACEAE

Key to Genera:

Flowers actinomorphic;

Climbing shrubs; leaves opposite; sepals petaloid; petals absent .....*1. Clematis*

Herbs; leaves forming basal rosette and/or alternate on the stem, dissected; sepals and petals distinct;

Carpels few and connate; fruit a globular inflatted capsule .....*2. Nigella*

Carpels many and free; fruit more less globular head of achenes .....*3. Ranunculus*

Flowers zygomorphic:

Erect herbs; petals 4; psteriors sepals spurred .....*4. Consolida*

Clematis Linn.

Clematis paniculeta Thaunb. Trans. Linn. Soc. 2:337, 1794.

Woody climber **Leaves** imparipinnat, opposite; petiole 5-8 cm long. Petiole and petiolate often twinning around substrata. Leaflets 3-5, 2.5-4 cm long, ovate to broad-ovate, obtuse, margins entire or toothed **Flowers** in axillary and terminal panicles, fragrant. **Sepals** 4, rarely 5 or 6, free, petaloid, linear-oblong. **Petals** none. **Stamens** numerous; **Anthers** 2-celled, adenate. **Carpels**

5-many, free, Ovary 2.5-3 mm long; style 1-1.5 cm long,hairy, persistant. Achenes flat, hairy, fruiting style plumose.

Cultivated in gardens on poles and pergolas.

Flowering: August-September; Fruiting: December.
Siddiqui 3140, Shaheed Uddyan.

2. Nigella Linn.

Nigella damascena Linn. Sp. Pl. 584, 1753; HFDD. 42 (in Obs), 1977.

A glabrous much branched annual. Flowers solitary terminal, white or light blue, surrounded by a very finly cut involucre. Fruit united to the top, making globular-oblong and inflatted capsule.

Cultivated as an ornamental.

Flowering: October-December; Fruiting: April-May.
Siddiqui 3150, Hardoi.

3. Ranunculus Linn.

Ranunculus scleratus Linn. Sp. Pl. 551, 1753; Royle 111. 53; HK. f. & T. Fl. Ind. 35; FBI. 1:19, 1872; FUGP. 1:19, Repr. ed. 1960; HFDD. 43, 1977; FPP. 2,1978.

An aquatic or amphibious glabourus herb. Stem fistular. Leaves irregularly loped or 3-partite. Flowers terminal or leaf opposed. Petals shining yellow. Seeds without intramarginal rib.

A very comman herb, found near the ponds, drains and other damp places.

Ethnobotanical Uses:

Bruised leaves are useful on sores. Seeds are used as stomachic and in skin diseases.

Flowering: January-February; **Fruiting:** March-April.

Local Name: 'Jaldhaniya'

Siddiqui 31218, Lucknow road.

Plants associated: *Alternanthera sessilis*, *Soliva anthemifolia*, *Catulla hemispherica*, *Potentilla supina* etc.

4. **Consolida** S. Gray

Consolida ambigua (Linn.) Ball & Heywood Repert. 66:151, 1961; Munz, Jour. Arn. Arb. 48:51, 1967; HFDD. 41, 1977.

Delphinum ambiguuam Linn. Sp. Pl. ed. 2. 749, 1763.

Delphinum ajasis auct. pl. (non Linn. 1753).

Consolida ajasis auct. pl. (non Schur. 1853).

Annual, cultivated herbs, few spreading branches. **Leaves** patiolate, lamina divided into linear segments. **Flowers** spicate recemes, bracteate, blue or pink to white, spurred; **Sepals** 5, petaloid, the posterior forming spur, bent upwards. **Petals** 4, fused, 2 posterior spurred inserted in the sepal spur. **Stamens** 10-many, base of filament, dilated; anthers yellow, basifixed, dithecous. **Carpel** 1 or more; style short; stigma capitate. **Fruit** a follicle, 1.5-2.5 cm long pubiscent. **Seeds** greyish black, tranversely-ridged.

Cultivated as ornamental plant.

Flowering: January-February; **Fruiting:** April.

Siddiqui 31215, Shaheed Uddyan.

II. DILLENIACEAE

Dillenia Linn.

Key to species:

Flowers solitary:

Petals white, 13-20 cm across.....1. *D. indica*

Petals yellow, 5-10 cm across.....2. *D. aurea*

1. **Dillenia indica** Linn. sp. pl. 535, 1753; FBI. 1:36, 1875; FUGP. 1:22, Repr. ed. 1960; Ind. Tr. 3, 1911; Hoogland in Blumea, 7:108, 1952.

Dillenia speciosa Thumb. in Trans. Linn. Soc. Lond. 1:200, 1791; Wight Icon. t. 823, 1844-45; Bedd. Fl. Sylvat. t. 103, 1871.

Tree, dense crowned, bark reddish-brown or grey, **Leaves** oblong-obovate or lanceolate 25-50 nerved; petiole 3-10 cm. **Flowers** solitary, white, nodding pedicel. **Sepals** 5, fleshy, concave, long persistent and acrescent. **Petals** 5, white, recurved over calyx. **Stamens** very numerous; anthers linear, terminal slit, the outer ones erect and extrorse and the inner ones recurved and introrse. **Carpels** 15-20, coherent, many ovules; styles expanded-recurved, white. **Fruit** indehiscent, 10-14 cm across, globose, enclosed by acrescent calyx. **Seeds** many, exarillate, reniform, balck, embeded in a colourless viscid pulp.

Cultivated in lawns, parks and private gardens.

Flowering: May-July; **Fruiting:** October-November.

Local Name: 'Chalta'

Siddiqui 31335, Shaheed Udhyan.

2. **Dillenia aurea** Sm. Exot. Bot. 2:65, t. 92, 93. 1805; FBI. 1:37, 1875; FUGP. 1:23, Repr. ed. 1960.

Dillenia pulcherrima Kurz in Journ. As. Soc. Beg. 46, 1871.

A small deciduous tree, bark grey or brown; young parts shaggy. **Leaves** obovate, oblong or elliptic, apex acute or rounded, glabrous, entire to slightly dentate, nerves 25-50 pairs. **Flowers** solitary, rarely 2 or 3, golden-yellow, bracteate. **Sepals** 5, fleshy, obovate or oblong. **Petals** 5, bright-yellow, broadly obovate. **Stamens** numerous, outer ones yellow straight, inner ones yellowish-white, reflexed, anthers long, terminal slit. **Carpels** 8-12, many ovules; styles radiating and recurved. **Fruit** indehiscent, yellow or orange, globular, including the acrescent sepals. **Seeds** 5, glabrous, exarillate, embeded in transparent slime.

Cultivated in lawns and private gardens.

Flowering: March-April; Fruiting: May-June.

Local Name: 'Aggai'

Siddiqui 31336, Shaheed Udhyan, Hardoi.

III. MAGNOLIACEAE

Michelia Linn.

Michelia champaca Linn. Sp. Pl. 536, 1753; FBI. 1:43 Ind. Tr. 8, Repr. ed. 1971; Talbot. For. Fl. 1:13, 1909; FPP. 3, 1978.

Michelia aurantica Wall. Pl. As. Rar. 2:39, 1830.

Tall evergreen. **Crown** oblong. **Bark** grey, smooth and thick. **Leaves** petiolate, ovate, lanceolate, acuminate, glabrous and shining above, glabrous or puberulous beneath. **Flowers** axillary, greenish yellow, with strong sweet fragrance, peduncled. **Perianth** lobes 10-15, whorled; outer ones silky-pubescent. **Stamens** numerous, free, flattened; anthers dithecous, introrse. **Carpels** 10-15, ovoid, subsessile arranged on a gynophore. **Fruit** a cluster of folicles. **Seeds** brown.

Planted in gardens. The flowers when put in water emit a very pleasant fragrance.

Ethnobotanical uses:

The flowers are diuretic and are used in gonorrhoea to relieve scalding, pounded with coconut oil they are applied as a plaster to inflammed parts. The root is said to be emmenagogue, and oil of the seed is rubbed into the abdomen to relelve flatulence.

Flowering: April-June; **Fruiting:** August-September.

Local Name: 'Champa'

Siddiqui 3130l, D.M. Lodge, Hardoi.

IV. ANNONACEAE

Key to Genera:

Fruit a fleshy syncarp; petals with a purple dot at the base .....*1. Annona*

Fruit a cluster berries or druplets; petals without purple spots at the base.

Leaf margins undulated; fruit a cluster of drupletes .....*2. Polyalthia*

Leaf margins not undulated; fruit a cluster of berries .....*3. Artabotrys*

1. Annona Linn.

Annona squamosa Linn. Sp. Pl. 537, 1753; FBI. 1:78, 1875; FUGP. 1:25, Repr. ed. 1960; Ind. Tr. 22, Repr. ed. 1971; FPP. 4, 1978.

Small, glabrous tree, 2-6 m tall with thin grey bark. Leaves oblong-lanceolate, pellucid and punctate, with a characteristic smell. Flowers pedicelled, drooping, greenish-yellow. Sepals 3, small. Petals 6, outer 3 well developed; inner minute or absent. Stamens numerous, with connective broad and truncate. Carpels many subconnate; carpels ultimatey confluent into a globose tubercled fleshy fruit with a peculiar smell. Seeds black or dark-brown enclosed in a white or creamy sweet pulp.

Common, cultivated and naturalized tree.

Ethnobotanical uses:

The crushed leaves are applied to the nostrils of women suffering

from hysterical or fainting fits. Seeds are used for abortions.

Flowering: March-May; Fruiting: July-November.

Local Name: 'Sharifa'

Siddiqui 31243, North Indian Bible Institute.

2. Polyalthia Blume.

Polyalthia longifolia (Sonn.) Thw. Enum. 398, 1864; FBI. 1:62, 1875; FUGP. 1:25, Repr. ed. 1960; FPP. 4, 1978.

Uvaria longifolia Sonn. Voy. Ind. Or. 2:233. t. 131, 1782.

Guatteria longifolia Wall. ex Wt. Arn. Prodr. 10, 1834.

A tall straight or glabrous tree. Bark grey. Crown pyramidal. Leaves lanceolate, acuminate, undulate, shining green above, pellucid dotted, lateral nerves on either side of midrib 20-35; petiole short. Flowers yellowish-green, pubescent, umbellate. Sepals 3, free, broadly ovate, acuminate, tips reflexed. Petals 6, biseriate, spreading narrow, lanceolate, acuminate. Anthers numerous, subsessile; anther cells grouped by truncate connectives. Fruit a cluster of druplets.

Common avenue tree, often trimmed to various shapes.

Flowering: April-May; Fruiting: July.

Siddiqui 31302, North Indian Bible Institute.

3. Artabotrys R. Br.

Artabotrys hexapetalus (Linn. f.) Bhandari in Baileya 12:147, 1964; FPP. 4, 1978.

Annona hexapetala Linn. f. Suupl. 270, 1781.

Artabotrys odoratissimus R. Br. ex Ker. in Bot. Reg. 5. t. 423, 1820; FBI. 1:54, 1872.

Large scrambling shrub; young branches puberulous. **Leaves** oblong or oblong-lanceolate, acuminate, both surfaces flobrous, glossy above, short petioled. **Flowers** on hooked peduncles 1 or 2 flowered, extra axillary peduncle, somewhat flattened, greenish, changing to yellow at maturity, very fragrant. **Sepals** 3, smaller than petals. **Petals** 6, in 2 whorls thick coriaceous; petals of ineer whorls slightly smaller. **Stamens** numerous; anthers adnate, extrorse, splitting length-wise. **Carpels** 8-12, free, linear-oblong, sparsely hairy, style forming an obtuse stigmatic apex. **Fruit** a cluster of berries, nearly sessile. **Seeds** 2, hard, marginal grooved distinct.

Cultivated in the gardens for the sake of fragrant flowers.

Flowering: July-November; **Fruiting:** October-January.

Siddiqui 31408, D.M. Lodge.

V. MENISPERMACEAE

Key to Genera:

Male flowers in fascicled cymes; stem without aerial roots.

Female flowers without foliaceous bracts.....*1. Cocculus*

Female flowers with foliaceous bracts.....*2. Cissampelos*

Male flowers in racemes; stem often with aerial roots .....*3. Tinospora*

1. Cocculus DC.

Cocculus hirsutus (Linn.) Diels. in Pfreich. 46:236, 1910; Santapau in Rec. Bot. Surv. Ind. 16(1):5, 1967; FPP. 5, 1978.

Menispermum hirsutum Linn. Sp. Pl. 341, 1753.

Cocculus villosus DC. Syst. 1:523, 1818; FBI. 1:101, 1875; FUGP. 1:29, Repr. ed. 1960; Ind. Tr. 26, Repr. ed. 1971.

A climbing undershrub; branchlets, leaves and inflorescence clothed with greyish hairs. **Bark** of old stem brownish-grey, peeling of scales. **Leaves** show much variation in size and shape, ovate to oblong-ovate, occassionally 3-lobed; abaxial surface more villous than adaxial, entire, base subcordate or truncate, 3-nerved, petioled. **Male flowers** in short peduncle cymes, bracts subulate. **Sepals** 6, 3 outer small, linear-obovate. **Petals** 6, acutely bifid, cuniate to obcordate. **Stamens** 6, free; filaments very short; anthers subglobose. **Female flowers** 1-3 or sometimes more in short peduncle cymes. **Sepals** same as in male flowers.

Petals slightly larger. **Staminodes** usually absent, sometimes represented by dot-like structures. **Carpels** 3, free; style curved outwardly. **Fruits** druplets, dark-blue to purple on ripening; slightly compressed distinct depression in the centre, with radiating subparallel ridges from tuberculate rim of the centre pit.

A very common climber, found climbing on a variety of plants *eg. Capparis sepiaria, Zizyphus oenoplia, Carissa opaca, Sacchrum spontaneus* and *Phoenix humilis*.

Ethnobotanical uses:

The juice of the leaves mixed with water and sugar and are taken internally as a cure for gonorrhoea. Decoction of root with goat milk flavoured with long pepper is administered in rheumatic and old veneral pains, and is considered heating, laxative and sudorfic.

Flowering: October-April; **Fruiting:** December-June.

Local Name: 'Cherenti'

Siddiqui 31522, Saktapur.

2. Cissampelos Linn.

Cissampelos pareira Linn. Sp. Pl. 1031, 1753; FBI. 1:103, 1875; FUGP. 1:31, Repr. ed. 1960; Diels, Pfreich. 46:286, 1910; Forman, Kew Bull. 22:356, 1968; Ind. Tr. 23, Repr. ed. 1971; HFDD. 45, 1977.

A slender, extensive climber. **Leaves** usually peltate, palmately nerved, reniform or cordate. **Male flowers** yellowish in cymose

Cissampelos pareira Linn.

clusters; bracts minute, subulate. **Sepals** 4, free. **Petals** 4, connate cupular. **Stamens** 4, columnar, synandrous. **Female flowers** in axillary racemes; bracts foliaceous, acrescent, cordate, reniform. **Sepal** 1, hairy outside, yellow obovate. **Petal** 1, broadly ovate, hairy outside, yellowish-green. **Carpel** 1, pilose; style 1; stigma 3-lobed. **Drupes** scarlet-red. **Endocarp** transversely ridged and tuberculate.

A very common climber on hedges.

Ethnobotanical uses:

The leaves and roots are employed for the cure of ulcers, skin diseases and in diarrhoea, dysentery. The dried roots are a mild tonic, diuretic, stomachic, anthelmintic, alterative and astringent, they are given with aromatics in later stages of bowels, dyspepsia, dropsy, prolapse of the uterus, internal inflammation and urinary bladder diseases. A dilute decoction of the root is used as blood purifier and syphilis.

Flowering: August-September; **Fruiting:** October-December.

Local Name: 'Katori-ki-bel'

Siddiqui 3142Ø, Bhulbhuliya.

3. Tinospora Miers

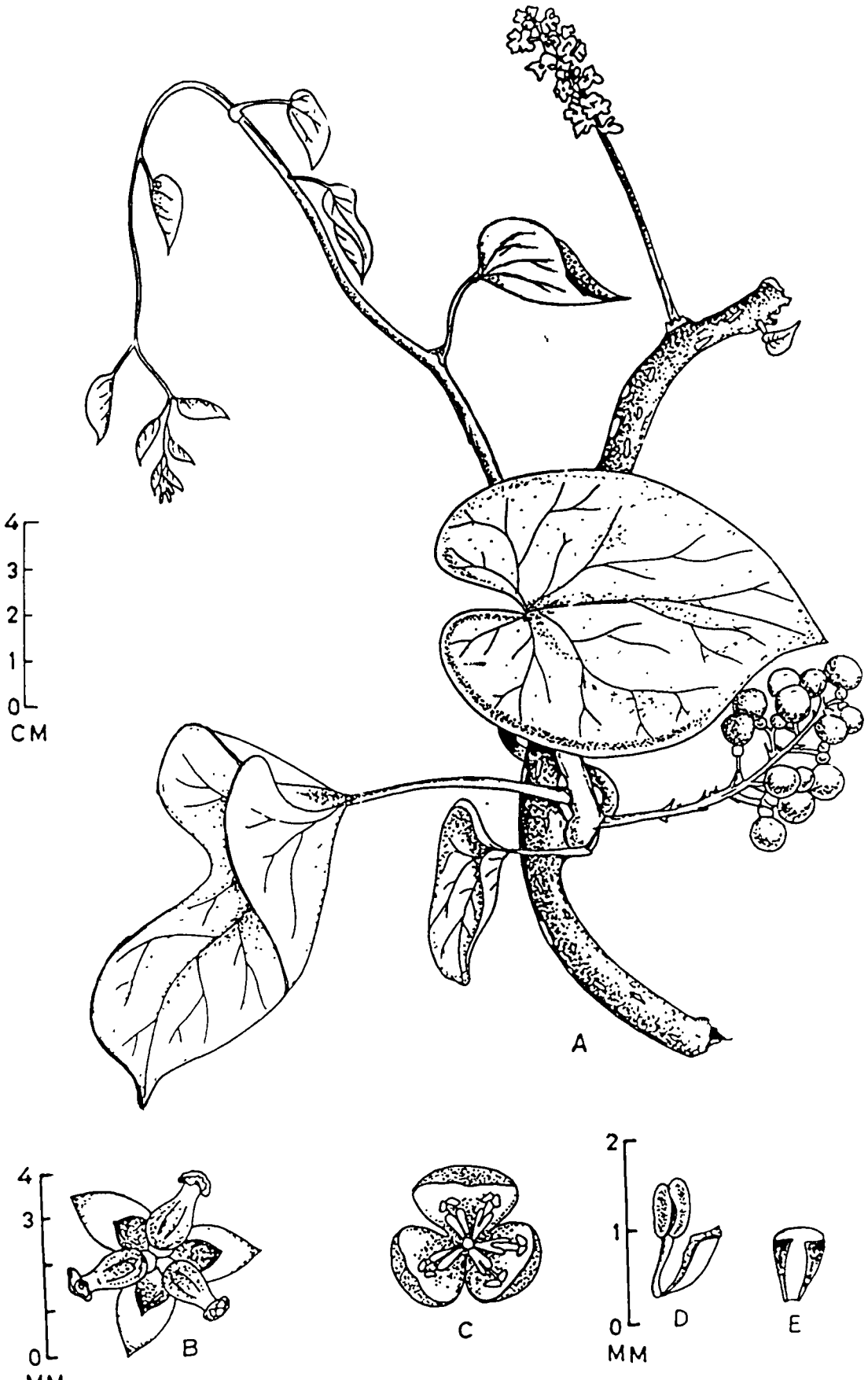
Key to species:

Leaves 5-1Ø cm in diameter, glabrous.....1. *T. cordifolia*

Leaves 1Ø-2Ø cm in diameter, tomentose.....2. *T. malabarica*

1. Tinospora cordifolia (Willd.) Hook. f. & Thoms. Fl. Ind. 184, 1955; Hook. f. & Thoms. in Hook. f. FBI. 1:97, 1872; Brandis, For. Fl. 8, 1874; FUGP. 1:27, Repr. ed. 196Ø; Forman in Kew Bull.

Tinospora cordifolia (Willd.) Miers
A. Flowering and Fruiting twig, *B.* Female flower,
C. Male flower, D. Stamen with petal, E. Petal.



Tinospora cordifolia (Willd.) Miers

36(2):4Ø3, 1981.

Menispermum cordifolium Willd. Sp. Pl. ed. 4. 4:826, 18Ø6; Roxb. Fl. Ind. ed. 2. 3:811, 1832.

Cocculus convolvulaceous DC. Syst. Veg. 1:518, 1817; Prodr. 1:97, 1824.

Cocculus cordifolia (Willd.) DC. Syst. Veg. 1:518, 1817; Prodr. 1:97, 1824; Wt. & Arn. Prodr. Ind. 12, 1834; Wt. Icon. 485, 1840-43; Voigt. Cat. Pl. Calc. 330, 1845.

Tinospora cripa (Linn.) Hook. f. & Thoms. var. *mitidiuscula* Miers in Ann. Mag. Nat. Hist. 3. 13:320, 1864; Contrib. Bot. 3:35, 1871.

Tinospora fosbergii Kundu in Ceyn. Journ. Sci. (Biol. Sci.) 12:49. ft. 1-3, 1976.

A large deciduous climber. **Stem** striate, pale-brown, bearing slender adventitious aerial roots; quite bitter in taste. **Leaves** cordate, petiolate; petiole swollen at base; lamina glabrous. **Flowers** yellow, racemes are panicle axillary or terminal, unisexual. **Sepals** 6 (3+3), 3 outer minute, 3 inner larger. **Petals** 6, free. **Stamens** 6; anther cells oblique and oblong. **Carpels** 3-10, born on a fleshy receptacle; style subulate. **Drupes** compressed red.

Often found climbing on *Mangifera indica*, *Syzygium cumini* and *Azadirachta indica*.

Ethnobotanical uses:

The fresh plant is considered more efficaceous than the dry. It

is antiperiodic, alterative, hepatic stimulant and diuretic; its watery extract, known as Indian Quinen is very effective in ordinary fevers due to cold or indigestion. The plant is commonly used in rheumatism, urinary diseases, dyspepsia, general debility, syphilis, skin diseases, jaundice and liver complaints. The juice of the fresh plant is administered with long pepper and honey in gonorrhoea, cough and chronic fever.

Flowering: May-July; **Fruiting:** October-January.

Local Name: 'Gurch'

Siddiqui 31337, Bhura tikku.

2. Tinospora malabarica Miers in Ann. & Mag. Nat. Hist. Ser. 2. 7:38, 1851; FBI. 1:96, 1875.

A large deciduous climber, soft wooded. **Stem** pale-brown with thin papery bark; young shoots pubescent. **Leaves** broadly ovate, acuminate, usually 7-nerved, pubescent, petioled with swollen base. **Flowers** yellow, small in racemes, pedicels about 6.5 cm long, slender. **Male flowers** fascicled 1-4, in subulate bracts. **Female flowers** solitary. **Sepals** 6, 3 inner larger than 3 outer. **Petals** 6, shorter than stamens. **Stamens** 6, dilated towards top. **Carpels** 3, divergent, on a receptacle. **Stigma** 2-fid. **Drupes** crimson or orange. **Endocarp** tubercled.

A very much confined upto forest area and usually climbing on tall trees in cool situations. It is more common.

Flowering: February-March; **Fruiting:** May-June.

Local Name: 'Nimkathia-Gurch'

Siddiqui 31222, Etouli.

VI. NYMPHAEACEAE

Nymphaea Linn.

Key to species:

Leaves entire; calyx not ribbed; apical appendage of the anthers usually acute.....1. *N. stellata*

Leaves toothed; calyx ribbed; apical appendage of the anthers usually absent.....2. *N. nouchali*

1. **Nymphaea stellata** Willd. Sp. Pl. 2:1153, 1799; FBI. 1:114, 1872; FUGP. 1:34, Repr. ed. 1960; Conard in Publ. Carneg. Instn. 4:140, 1905; HFDD. 48, 1977; Aq. Ang. 6, 1962.

Annual, aquatic herb with a subterranian, erect, fleshy root stalk. **Leaves** elliptic or orbicular, peltate, sinuate at the base, flabrous, green above and purple beneath. **Flowers** blue, purplish or white, slightly fragrant. **Sepals** 4, lanceolate, not ribbed, often purple streaks. **Petals** 10-20, linear-lanceolate. **Stamens** 10-50; anthers tipped with long, acute appendage. **Carpels** 10-15, connate, stigmatic rays corresponding to the number of carpels, prominent. **Fruits** roundish. **Seeds** smooth.

A very common aquatic herb.

Ethnobotanical uses:

The juice of the leaves is given in diarrhoea. An infusion of the rhizome and stem is used for blennorrhagia diseases of the urinary tracts and also consider as emollient and diuretic.

Flowering: August-September; **Fruiting:** October-November.

Local Name: 'Gujari'

Siddiqui 31488, Sadai behta.

2. **Nymphaea nouchali** Burm. f. Fl. Ind. 120, 1768; Merr. in Philipp. Journ. Sci. 19:350, 1921; HFDD. 48, 1977; Aq. Ang. 6, 1962.

Nymphaea pubescens Willd. Sp. Pl. 2:1154, 1799.

Nymphaea rubra Hook. f. & Thoms. FBI. 1:14, 1872 (non Linn. 1753).

Nymphaea rubra Linn. Sp. Pl. 511, 1753; Roxb. Fl. Ind. 2:577; FUGP. 1:34, Repr. ed. 1960.

Nymphaea lotus var. *pubescens* Hook. f. & Thoms.

An aquatic herb with fleshy, short, erect, roundish and tuberous root stock. **Leaves** floating; margins sharply toothed, segittately peltate, suborbicular or reniform, deeply cordate, pubescent beneath; petiole inserted, usually submerged. **Flowers** white or pink deep-red. **Sepals** 4, ribbed, oblong. **Petals** many, oblong, persistent. **Stamens** numerous; filaments broadly dilated at base; anthers white apical appandage, pollen grain smooth. **Carpels** many, sunk in the disk and forming a syncarpous ovary; stigma radiating. **Fruits** submerged, irregularly cracked. **Seeds** many, ellipsoid, rough.

Abundant in ponds, ditches and temporary water bodies during rainy season.

Flowering: August-September; **Fruiting:** October.

Siddiqui 31490, Sadai behta.

VII. NELUMBONACEAE

Nelumbo Adans.

Nelumbo nucifera Gaertn. Fruct. 1:73. t. 19. f. 2. 1788; Santapau in Rec. Bot. Surv. Ind. 16(1):6, 1967; Aq. Ang. 8, 1962; FPP. 7, 1978.

Nelumbium speciosum Willd. Sp. Pl. 2:1258, 1799; FBI. 1:116, 1872; FUGP. 1:35, Repr. ed. 1960.

An aquatic herb with creeping rhizome. **Leaves** orbicular, raised above the surface of water, without sinus at the base, entire, petioled. **Flowers** solitary-axillary, raised above water surface, white or pink. **Sepals** 4-5 caducus. **Petals** many, free, obovate, concave, later spreading, caducus, gradually passing into stamens. **Stamens** numerous; anther with a club-shaped appendage at the apex. **Carpels** 15-25, sunk in a large fleshy torus. **Fruits** consisting of fleshy, obconic, receptacle in which carpels are inserted; nut ellipsoid.

Often planted in tanks.

Ethnobotanical uses:

The flower stock and flowers are refrigerant, astringent, cardiac tonic and diuretic, they are prescribed in fever, diarrhoea, cholera and liver disorders. The flowers are given in the form of a syrup in cough, menorrhagia and bleeding piles. Seeds are given to check vomitting. A paste of the seeds is used locally over the skin diseases. Root stock is mucilaginous, demolcent, diuretic it is given in piles, dyspepsia and diarrhoea. Its paste

is locally used for ring worm and other skin diseases.

Flowering: March-September; **Fruiting:** November-December.

Local Name: 'Kamal'

Siddiqui 31489, Sadai behta.

VIII. PAPAVERACEAE

Key to Genera:

Erect herb; capsule short, opening by apical pores; latex milky or yellow.

Whole the plant spinous; flowers very shortly pedicelled; yellow or whitish-yellow ..... 1. *Argemone*

Plant hairy, not spinous; flowers long pedicelled; bud nodding; flowers red, pink or white ..... 2. *Papaver*

Spreading herbs; capsule conical, opening by valves; latex watery; flowers orange ..... 3. *Eschscholtzia*

1. **Argemone** Linn.

Key to species:

Flowers bright yellow; bud subspherical; stigma broad, not spreading widely ..... 1. *A. mexicana*

Flowers lemon yellow; bud oblong; stigma narrow, spreading widely ..... 2. *A. ochroleuca*

1. **Argemone mexicana** Linn. sp. Pl. 508, 1753; FBI. 1:117, 1875; FUGP. 1:37, Repr. ed. 1960; Fedde, Pfreich. 4. 273, 1909; Ownb. Mem. Torrey Bot. Cl. 12:29-31, 1958; Brittonia 13:103, 1961; HFDD. 49, 1977.

A large spiny herb, mostly unbranched; latex yellow. Stem herbaceous or half woody below, prickled. **Leaves** lower petioled,

upper ones sessile and semi-amplexicaul, sinuate, pinnatifid, spinulose-dentate, glaucous, white pruinose, 5.0-10 cm long. **Flowers** solitary, terminal, sessile or shortly pedicelled. **Sepals** 3, free, corniculate, cucullate, caducous, spinescent. **Petals** 6, obovate, distinctly veined, bright yellow. **Stamens** numerous, shorter than corolla. **Stigma** subsessile dark red. **Carpels** 3-8, fused ovary covered with sharp bristles, 1-celled, parietal placentae, style one. **Fruit** obtusangular capsule, covered with sharp bristles, dehescing by valves. **Seeds** numerous globose oily.

Abundant throughout the area, nearly every type of soil.

Ethnobotanical uses:

The juice is diuretic and alterative, it is given in dropsy, jaundice, skin diseases and with the combination of *Aristolochia* sps. juice in syphilis and gonorrhoea. The juice is applied to blisters, rheumatic pains, excoriations, ulcers, scabies, herpetic eruptions. The root is alterative and stimulant; its decoction is given in gonorrhoea, blennorrhoea, gleet, vascular calculus and skin diseases. The root paste is applied over boils. The seeds are narcotic, stomachic, emetic, expectorant, nauseant, cathartic and demolcent. They are given in cough, pulmonary disease, asthma and whooping cough.

Flowering: December-April; **Fruiting:** February-May.

Local Name: 'Bhatkataya' or 'Pili katile'

Siddiqui 31221, Etouli.

2. **Argemone ochroleuca** Sweet. Brit. Fl. Gard. 3. t. 242, 1828; Ownb. in Mem. Torney Bot. Cl. 21: No. 1, 1958; C. S. -venkatesh, Proc. 47th Indian Sc. Cong. 47:401, 1960; Curr. Sc. 31(6):250-251, 1962; Suppl. FUGP. 5, 1976.

The taxon may be distinguished from *A. mexicana* by its lemon-yellow flowers. Malhotra (1960) has shown it to be cytologically distinct species, being octoploid.

Not uncommon, grown in association with *A. mexicana*.

Ethnobotanical use:

Root is used to prevent the natural abortion.

Flowering: December-April; **Fruiting:** February-May.

Local Name: 'Safed bhatkataya'

Siddiqui 31340, Chhatouri.

2. **Papaver** Linn.

Key to species:

Leaves amplexicaul; flowers white.....1. *P. somniferum*

Leaves not amplexicaul; flowers red or pink .....2. *P. rhoeas*

1. **Papaver somniferum** Linn. sp. Pl. 508, 1753; FBI. 1:117, 1875; FUGP. 1:36, Repr. ed. 1960.

A small herb with milky latex turning to brown when exposed. Leaves sessile, amplexicaul base, coarsely crenate-dentate, glabrous. Flowers white, solitary on long peduncles, 10-15 cm across. Sepals 2, free, caducous, glabrous. Petals 4-6 free,

orbicular, corrugate, imbricate. **Stamens** numerous; filaments filiform, anthers dehiscing longitudinally. **Style** none; **Stigma** radiating from a crown. **Fruits** broadly ovoid. **Capsule** containing milky latex. **Seeds** creamy-white.

Cultivated rarely on seeking licence from Government.

Ethnobotanical uses:

There are many uses of the plant as a whole and its very important product i.e. opium. The disease in which plant or plant products used are rheumatism, tumours of different kinds, cancer, carbuncles, abscesses, ulcers connected either with the leprosy. syphilis or scrofula, colic, cholera, relieving pain and irritation of the bladder, caused by the presence of stone in bladder, painfull affection of kidneys, diabetes, dysentery and vomitting.

Flowering: December-January; **Fruiting:** March-April.

Local Name: 'Posta'

Siddiqui 31521, Saktapur.

2. Papaver rhoeas Linn. Sp. Pl. 507, 1753; FBI. 1:117, 1875; Man. Cult. Pl. 425, 1949; FUGP. 36, Repr. ed. 1960; HFDD. 51, 1977.

Annual cultivated ornamental herb. **Stem** slender hairy. **Leaves** subsessile with non-amplexicaul base; deeply pinnatifid surface hispid hairy. **Flowers** solitary, terminal long pedicelled; bud nodding. **Sepals** 2, free, caducous. **Petals** 4-6, red or pink with dark spot at the base. **Stamens** with filiform filaments; anthers 2-celled, dehiscing lengthwise. **Carpels** 7-12, fused, ovary

glabrous. **Fruits** capsule, 1.5-2.5 cm long. **Seeds** many, dark-brown.

Ornamental, much sought after by lovers of seasonal flowers.

Flowering: December-January; **Fruiting:** February-March.

Local Name: 'Garden-popy'

Siddiqui 31901, Tara Academy, Hardoi.

3. Eschscholtzia cham.

Eschscholtzia californica cham. in Nees, Hort. Phys. Berol. 74, 1820; Man. Cult. Pl. 426, 1949.

Annual, cultivated herb. **Stem** spreading, sulcate, hollow. **Leaves** long petioled, pinnately partite; segments linear-oblong. **Flowers** solitary, yellow-orange, very delicate. **Sepals** 2, partially connate. **Petals** 4, rarely 6, obovate-cuneate. **Stamens** numerous, free, filament short. **Carpels** 2-3, fused ovary lanceolate. **Capsule** distinctly ribbed with recurved basal valves. **Seeds** many, reticulate.

cultivated as garden plant.

Flowering: January-February; **Fruiting:** April-March.

Siddiqui 31906, S.P. Lodge, Hardoi.

IX. FUMARIACEAE

Fumaria Linn.

Fumaria indica (Hassk.) Pugsley in Journ. Linn. Soc. Lond. 44:313, 1919; HFDD. 51, 1977.

Fumaria vaillantii Loisel var. *indica* Hassk. in Flora 56:443, 1873.

Fumaria parviflora Lamk. var. *vaillantii* Hook. f. & Thoms. Fl. Ind. 258, 1855.

Fumaria parviflora Lamk. Subsp. *vaillantii* Hook. f. FBI. 1:128, 1875; FUGP. 1:37, Repr. ed. 196Ø.

Pale-green, much branched, bitter herb, branches ascending or diffuse. **Stem** pentagular, fistular, glabrous. **Leaves** decompound, segments linear, lanceolate, exstipulate. **Racemes** leaf-opposed, lax. **Flowers** bracteate; bracts being small than the pedicele. **Sepals** 2, small, triangular, caducous, hyaline with slightly pinkish tinge; margins shortly fimbriate. **Petals** 4 (2+2), outer 2 unequal; the posterior being spurred at the base; 2 inner lighter in colour, coherant at the top, equal and keeled at the back. **Stamens** in 2 bundles, filaments membranous, hyaline and dilated at the base, the lateral anthers 1-celled while the central one is 2-celled in each case. **Carpels** 2, syncarpous; ovary superior, 1-celled, 2-parietal placentae; ovule usually 1. **Style** 1, filiform; stigma lobed. **Fruit** globose, single seeded.

A very common weed of wheat fields.

Ethnobotanical uses:

Seeds and leaves are considered as cooling, diaphoretic, diuretic and laxative. It is also used in skin affections.

Flowering : December-February; Fruiting: March-April.

Local Name: 'Pitpapra'

Siddiqui 31575, Chak.

plants associated: *Anagallis arvensis*, *Vicia hirsuta*, *Stellaria media* etc.

X. BRASSICACEAE (CRUCIFERAE nom. alt.)

Key to Genera:

Flowers white; pod long or short.

Small herbs without fleshy root stock.

Amphibious; pods long; seeds two-seriate ..... 1. *Rorippa*

Terrestrial; pod short.

Flowers zygomorphic ..... 2. *Iberis*

Flowers actinomorphic ..... 3. *Alyssum*

Large herbs with fleshy roots ..... 4. *Raphanus*

Flowers yellow, pink or white (then the pod not short).

Stamens six; erect herbs.

Pod unbeaked (with 2 short horns in *Matthiola*).

Pod nearly glabrous.

Flowers white; ebracteate..... 5. *Arabidopsis*

Flowers yellow; bracteate..... 6. *Sisymbrium*

Pod hairy; flowers pink or white ..... 7. *Matthiola*

Pod beaked.

Flower sulphur-yellow; stigma capitate; seeds in one row ..... 8. *Brassica*

Flowers with purple veins;
stigma deeply 2-lobed; seeds
seeds in two rows .....9. *Eruca*

Stamens two, prostrate herbs .....*10.* *Coronopus*

1. **Rorippa** Scop.

Rorippa nasturtium-aquaticum (Linn.) Hayek in Sched. Fl. Stir. Exs. 22, 1905; Hochr. Candollea 2:368, 1925.

Sisymbrium nasturtium-aquaticum Linn. Sp. Pl. 657, 1753.

Nesturtium officinale R. Br. in W. Ait. Hort. Kew. ed. 2. 4:111, 1812; FBI. 1:133, 1872; FUGP. 1:39, Repr. ed. 1960; Aq. Ang. 9, 1962.

Aquatic or amphibious, glabrous herb; rooting at the nodes. **Leaves** pinnatifid with 2-10 lobes; base cordate. **Flowers** white in elongate, ebracteate raceme; the pedicel elongates with maturation of fruit. **Pods** slightly upcurved. **Seeds** in two rows (usually) orange-red.

Common on the banks of Bhasenta river. In this species the extent of development of root system seems to be influenced by amount of water available. The plants growing in a water body develop small roots while those growing on moist sand develop a very extensive root system.

Flowering & Fruiting: December-April.

Siddiqui, 31164, Bhasenta river.

2. **Iberis** Linn.

Iberis amara Linn. Sp. Pl. 649, 1753; Man. Cult. Pl. 441, 1949;

HFDD. 58, 1977.

Erect or ascending cultivated, ornamental plants. Lower leaves pinnate partite; upper ones sessile, dentate. **Flowers** white in flat topped corymbose raceme. **Petals** 4, two short and two large.

A very common ornamental plant, much valued for bedding purposes. Some times met with as an escape.

Flowering & Fruiting: December-April.

Siddiqui 31113, Hardoi.

3. **Alyssum** Linn.

Alyssum maritimum (Linn.) Lamk. Encycl. 1:98, 1783.

Clypeola maritima Linn. Sp. Pl. 652, 1753.

This is also an ornamental plant and resembles much with *Iberis amara* but can be distinguished by its actinomorphic flowers.

Commonly used for bedding purposes in lawns.

Flowering & Fruiting: January-April.

Siddiqui, 31200, Shaheed Udhyan.

4. **Raphanus** Linn.

Raphanus sativus Linn. Sp. Pl. 669, 1753; FBI. 1:166; FUGP. 1:48, Repr. ed. 1960; Schulz, Pfreich. 70:1-290, 1919; Man. Cult. Pl. 439, 1949; HFDD. 60, 1977.

Erect herbs with fleshy tap root having a pungent taste. Lower leaves long-petioled, upper short-petioled. **Flowers** white or pale-purple. **Pods** long, erect or erecto-patent, beaked.

Commonly cultivated as vegetable, locally called as 'Mooli'.

Flowering & Fruiting: January-April.

Siddiqui 31143, Hardoi.

5. **Arabidopsis** Heynh.

Arabidopsis thalianum (Linn.) Heynh. in Holl. & Heynh. Fl. Sachs. 1:538, 1842; Schulz. Pfreich. 86:270, 1924; HFDD. 530, 1949.

Arabis thaliana Linn. Sp. Pl. 665, 1753.

Sisymbrium thalianum J. Gay in Ann. Sci. Nat. Ser. I. 7:399, 1826; FBI. 1:148; FUGP. 1:41, Repr. ed. 1960.

A very slender branched, hairy annual; lower leaves petioled, lanceolate, finely toothed; upper ones sessile. **Flowers** minute, white. **Pods** slender, erect. **Seeds** very small flattened.

Not very common. In lawns among the grasses.

Flowering & Fruiting: December-March.

Siddiqui 31187, Hardoi.

Plants associated: *Fumaria indica*, *Anagallis arvensis*, *Lolium* sp. etc.

6. **Sisymbrium** Linn.

Sisymbrium irio Linn. Sp. Pl. 659, 1753; FBI. 1:150, 1875; FUGP. 1:41, Repr. ed. 1960.

An erect herb with leaves lyrate and confined mostly towards the base. **Flowers** minute, yellow. **Pods** up-curved, glabrous. **Seeds** ovoid, 1-seriate yellowish-brown.

Not very common.

Siddiqui 31192, Railway Station Godowns, Hardoi.

Plants associated: *Solanum nigrum*, *Stellaria media*, *Oldenlandia corymbosa* etc.

7. **Matthiola** R. Br.

Matthiola incana (Linn.) R. Br. In Ait. Hort. Kew. 4:119, 1812; Man. Cult. Pl. 448, 1949.

Cherianthus incanus Linn. Sp. Pl. 662, 1753.

An annual with white or grey pubescens. **Leaves** subfleshy, lanceolate, hoary. **Flowers** in lax racemes, pink, purple or white. **Fruits** slightly compressed, many seeded. **Seeds** lenticular, alate allround, light-brown.

A winter annual. Frequently planted in beds.

Flowering & Fruiting: January-April.

Siddiqui 31195, Shaheed Udhyan.

8. **Brassica** Linn.

Key to species:

Stems well developed, tall and herbaceous.

Seeds brown-black .....1. *B. juncea*

Seeds yellow .....2. *B. campestris* var. *sarson*

Stem absent or very short and hard.

Herbs without stem; root napiform .....3. *B. rapa*

Herbs with short and hard stem, root normal.

Young inflorescence forming a

creamy or yellow mass .....4. *B. oleracea* var. *botrytis*

Leaves orbicular and condensed

to form a compact spherical head.....5. *B. oleracea* var. *capitata*

Stem base tuberous .....6. *B. oleracea* var. *gongylodes*

1. **Brassica juncea** (Linn.) Czern. Consp. Pl. Charc. 8, 1859; FBI. 1:157; FUGP. 1:43; Schulz, Pfreich. 70:55, 1919; Bailey, Gent. Herb. 2:258, 1930; HFDD. 54, 1977.

Sinapis juncea Linn. Sp. Pl. 668, 1753 (excl. Syn. Herm.).

Erect branching herb, glabrous. Lower leaves oblong-lanceolate, petioled, lyrate; upper lanceolate, entire or toothed, subsessile. Flowers yellow, racemes terminal and axillary. Pods linear-lanceolate, beak straight, straw coloured when ripe. Seeds brownish-black, round.

Flowering & Fruiting: January-April.

An important oil crop of the area. Sown alone or mixed with wheat.

2. **Brassica campestris** Linn. Sp. Pl. 666, 1753; FBI. 1:156 (excl. subsp. *napus* & *rapa*); FUGP. 1:45; Schulz, Pfreich. 70:45, 1919; Bailey, Gent. Herb. 2:245, 1930; HFDD. 54, 1977.

Vegetatively resembles with *B. juncea*. But distinguishable by its long beaked pod and yellow seeds.

Flowering & Fruiting: January-April.

An important oil crop of area. Sown alone or mixed with wheat.

3. **Brassica rapa** Linn. Sp. Pl. 666, 1753; Bailey in Man. Cult. Pl. 436, 1949.

Stemless herb with napiform roots. **Leaves** crowded, lyrate, hairy. **Flowers** in racemes, yellow. **Pods** long beaked. **Seeds** dark-brown, globular.

Flowering & Fruiting: April-May.

Vegetable crop, locally called as 'Shaljam' or 'Shalgham'.

4. **Brassica oleracea** Linn. var. *botrytis* Linn. Sp. Pl. 667, 1753; Bailey in Man. Cult. Pl. 436, 1949; HFDD. 55, 1977.

Stout herb with short stem. **Leaves** dark-green, veins light coloured, fleshy. **Flowers** in irregular racemes, light yellow. Rachises and pedicels of young inflorescens condensed to form a compact, fleshy, white creamy mass. **Seeds** globular, dark-brown.

Flowering & Fruiting: March-May.

An important vegetable crop. Locally called as 'Phool-gobhi' (Cauliflower).

5. **Brassica oleracea** Linn. var. *capitata* Linn. Sp. Pl. 667, 1753; Man. Cult. Pl. 436, 1949.

A stout herb, differs from *B. oleracea* var. *botrytis* in having a globular ball like head, composed of condensed leaves.

Flowering & Fruiting: March-May.

Vegetable crop, locally called as 'Band-gobhi' or 'Pat-gobhi' (Cabbage).

6. **Brassica oleracea** Linn. var. *gongylodes* Linn. Sp. Pl. 667, 1753; HFDD. 55, 1977; FPP. 12 (var. *gongloides*), 1978.

Stem tuberous at base.

Vegetable crop, locally called as 'Ganth-gobhi'.

9. **Eruca** Adans.

Eruca sativa Mill. Gard. Dict. ed. 8. n. 1, 1768; FBI. 1:158; FUGP. 1:45, Repr. ed. 1960; Schulz, Pflanzenfan. ed. 2. 17b:346, 1936; Bailey in Man. Cult. Pl. 439, 1949; FPP. 13, 1978.

Brassica eruca Linn. Sp. Pl. 667, 1753.

Erect branched herb. Lower leaves lyrate, hairy; upper linear-lanceolate, or shallowly dentate. **Flowers** in long racemes, yellow or cream-yellow with purple veins. **Pods** slightly flattened, appressed against the fruiting stalk, beaked; valves 1-nerved. **Seeds** reddish-brown.

Cultivated. The seeds yield oil.

Flowering & Fruiting: January-April.

Siddiqui 31121, Bilgram Road.

10. **Coronopus** Linn.

Coronopus didymus (Linn.) Smith FBI. 2:691, 1804; HFDD. 57, 1949.

Lepidium didymum Linn. Syst. 2:433, 1754.

Lenebiera pinnatifida DC. Mem. Soc. Hist. Nat. Paris 144. t. 9, 1799; FUGP. 1:467, Repr. ed. 1960.

Annual prostrate or decumbent herb. **Leaves** sometimes forming a rosette. Basal leaves six-ten lobed; the upper ones 3-5 lobed,

both pinnatifid. **Flowers** small in leaf opposed racemes. **Sepals** 4. **Petals** usually none, sometimes very rudimentry. **Stamens** 2. **Fruits** 2-lobed, compressed, 2-seeded.

Very common in waste places.

Flowering & Fruiting: November-May.

Siddiqui 31135, Sadai behta.

Plants associated: *Malvastrum coromandelianum, Spergula fallax, Mazus rugosus, Cynodon dactylon* etc.

XI. CAPPARACEAE

Key to Genera:

Glandular herbs; leaves digitately compound; fruit a capsule .....*1. Cleome*

Eglandular shrubs or trees; fruit a berry

Erect or climbing shrubs with hooked spines .....*2. Capparis*

Trees, without spines; flowers creamy, appearing before the leaves .....*3. Crataeva*

1. Cleome Linn.

Key to species:

Gynandrophore present, flowers white or creamy.....1. *C. gynandra*

Gynandrophore absent, flowers bright yellow.....2. *C. viscosa*

1. Cleome gynandra Linn. Sp. Pl. 671, 1753; II Tis in Brittonia, 12(4):279-294, 1960; Jacobs in Fl. Males. 6(1):101, 1960; FPP. 18, 1978.

Cleome pentaphylla Linn. Sp. Pl. 938, 1763.

Gynandropsis pentaphylla (Linn.) DC. Prodr. 1:238, 1824; FBI. 171, 1875; FUGP. 1:49, Repr. ed. 1960.

Gynandropsis gynandra (Linn.) Brig. in Ann. Cons. Tard. Bot. Geneva 17:382, 1914.

An annual glandular hairy, pungent smelling herb. **Leaves** 5-foliate except most basal which are trifoliate; leaflets

oblong-obovate, acute. **Flowers** corymbose racemes, white or creamy, viscid; bracts 3-foliate. **Sepals** 4, free, spreading. **Petals** 4, free, creamy-colour. **Stamens** 6, free; filaments long born on a gynandrophore; anthers cell purple. **Carpels** 2, syncarpous; ovary stalked (gynophore), parietal placentae; style 1, short stigma capitate. **Fruit** a capsule, striate, many seeded. **Seeds** dark-brown, reniform.

A common waste lands or road sides herb during rainy season.

Ethnobotanical uses:

The seeds and leaves of the plants are administered as decoction in typhous fever. Leaves are applied to the boils to prevent the puss formation.

Flowering : July-August; **Fruiting:** September-October.

Local Name: 'Hurhur'

Siddiqui 3140l, Madia.

Plants associated: *Tridax procumbens*, *Eclipta prostrata*, *Cynoglossum* sp. and *Cyprus rotundus*.

2. **Cleome viscosa** Linn. Sp. Pl. 672, 1753; FBI. 1:70, 1875; FUGP. 1:50, Repr. ed. 1960; Jacobs Fl. Males. Ser. 1, 6:103, 1960; HFDD. 63, 1977.

Cleome icosandra Linn. Sp. Pl. 672, 1753.

Polanisia viscosa DC. Prodr. 1:242, 1824.

An erect annual mostly unbranched, glandular herb. **Leaves** 3-5 foliate, alternate, petiolate, glandular hairy; leaflets elliptic-obovate to oblong, acute or obtuse, cuneate. **Flowers**

yellow, pedicelled in terminal corymbose racemes. **Sepals** 4, free, shorter than petals. **Petals** 4, free, yellow. **Stamens** many. **Gynoecium** bicarpellary; ovary 1-celled. **Style** 1; stigma capitate. **Capsule** long, shortly beaked. **Seeds** dark-brown, reniform.

A very common rainy season herb on road sides, in waste lands and gardens.

Ethnobotanical uses:

Juice of the leaves is used in deafness. Juice mixed with mustard oil and used for the remedy of purulent discharges from the ear. The seeds are anthelmintic and carminative.

Flowering : July-September; **Fruiting:** September-October.

Local Name: 'Peeli-hurhur'

Siddiqui 31430, Bara gaon.

Plants associated: *Oldenlandia corymbosa*, *Amaranthus* sp., *Achyranthes aspera* etc.

2. **Capparis** Linn.

Key to species:

A small tree with white flowers in terminal corymbose or racemes .....1. *C. grandis*

A climbing shrub with purple flowers supra-axillary in vertical line .....2. *C. zeylanica*

1. **Capparis grandis** Linn. f. Suppl. 263, 1781; FBI. 1:176, 1875; FUGP. 1:51, Repr. ed. 1960.

A small tree with pubescent branches. **Leaves** broadly ovate or

obovate, obtuse or retuse, pubescent beneath. **Flowers** arranged in corymbose at the ends of branches, white pedicillate. **Sepals** 4, free, concave. **Petals** 4, free, white, narrowly obovate. **Stamens** many; anthers 2-celled. **Carpels** 2-4 syncarpous; ovary glabrous, 1-celled, parietal placentae; stigma sessile, capitate. Fruit purple when ripe.

Commonly found in scrub forests.

Flowering: September-November; **Fruiting:** December-January.

Siddiqui 3147Ø, Asgaon.

2. **Capparis zeylanica** Linn. Sp. Pl. ed. 2, 72Ø, 1762 (non Hook. f. & Thoms. 1872); Jacobs Fl. Males. Ser. 1. 6:87, 196Ø; Blumea 12:5Ø5, 1965; HFDD. 64, 1977.

Capparis horrida Linn. f. Suppl. Pl. 264, 1781; FBI. 1:178, 1875; FUGP. 1:52, Repr. ed. 196Ø.

A medium sized climber, internodes long. **Stem** woody with rough, grey corky barks, young shoots green tomentose. **Leaves** simple, coriaceous, ovate-oblong, acute or mucronate, upper surface glutinous, stipular, spines hooked. **Flowers** supra-axillary, some times solitary or 2-3 on short shoot, white turning to pink at length. **Sepals** 4, free, concave, tomentose. **Petals** 4, free, white becoming pink with age, oblong. **Stamens** numerous, exceeding the petals; filaments pink, anthers dithecous. **Carpels** 2, fused; ovary seated on long gynophore, glabrous. **Fruit** a globose berry, deep violet when ripe.

A common climber of the summer season, climbs on a variety of plants.

Ethnobotanical uses:

Root is reputed to be a cooling medicine and the leaves are applied as a counter irritant.

Flowering : March-May; **Fruiting:** July-September.

Local Name: 'Karalva'

Siddiqui 31292, Jhala.

3. Crataeva Linn.

Crataeva odora Buch. -Ham. in Trans. Linn. Soc. 15:118, 1827; Jacob, Fl. Males. Ser. 1. 6:66, 1960; FPP. 19, 1978.

Capparis trifoliata Roxb. Hort. Beng. 41, 1814.

Crataeva religiosa auct. (non Forst.)

Crataeva religiosa Forst. f. Prodr. 35, 1786; Royl. 111, 72; FBI. 1:172, 1875; FUGP. 1:50, Repr. ed. 1960.

A medium sized, unarmed, deciduous tree. **Bark** grey, horizontally wrinkled. **Leaves** 3-foliate, clustered at the ends of the branches; leaflets ovate-lanceolate, acuminate, glaucous. **Flowers** in terminal corymbs, white or creamy. **Sepals** 4, petaloid, oblong or obovate, acute. **Petals** 4, slightly unequal, long clothed, oblong-ovate. **Stamens** 13-18, free, much exceeding the petals; filaments slender, purple. **Carpels** 2, syncarpous; ovary globose on a long gynophore which is persistent in a fruit. **Fruits** many seeded, ovoid berry. **Seeds** embedded in yellow pulp, reniform compressed.

Generally planted in gardens or on road sides.

Ethnobotanical uses:

The leaves are used as a remedy for swelling of the feet and a burning sensation in the soles of the feet and its juice in rheumatism.

Flowering : April-May; **Fruiting:** July-August.

Local Name: 'Barna'

Siddiqui 31929, Chhatriya College.

XII. VIOLACEAE

Key to Genera:

Leaves linear-lanceolate; stipules subulate, gland tipped; flowers red .....*1. Hybanthus*

Leaves ovate-oblong; stipules large; foliaceous, lyrate; flowers differently coloured not red .....*2. Viola*

1. **Hybanthus** Jacq., nom. cons.

Hybanthus enneaspermus (Linn.) F. Muell. **Fragm.** 10:81, 1877.

Viola enneasperma Linn. Sp. Pl. 937, 1753.

Ionidium enneaspermum (Linn.) Vent. Jard. Malm. Sub. t. 27. 1803; FUGP. 1:56, Repr. ed. 1960.

An erect or diffuse herb; base woody. **Leaves** linear-lanceolate, shortly petioled. **Flowers** reddish-violet, solitary axillary on 6.0 mm long pedicel, with 2 small bracteoles. **Sepals** 5, unequal 2 upper ones oblong, larger than sepals, 2 lateral larger, falcate, the 5th posterior one long clawed. **Stamens** 5, free, 2 anterior filaments appendi- culate, connective prolonged beyond the cells forming apical appendage; anther 2-celled yellow, longitudinally dehiscent. **Carpels** 3, connate; ovary ellipsoid, glabrous, 1-celled with 3 parietal placentas, 2-many ovuled; style 1, slightly curved; stigma calvate. **Fruit** a capsule elastically 3-valved, many seeded. **Seeds** yellowish-brown, striate.

Occassionally found in sandy soil.

Flowering : August-October; **Fruiting:** October-November.

Siddiqui 31462, Khurriya.

Plants associated: *Evolvulus alsinoides*, *Indigofera linnae*, *Centipeda minima* etc.

2. **Viola** Linn.

Viola tricolor Linn. Sp. Pl. 935, 1753.

An erect annual herb. **Stem** branched, glabrous and angular. **Leaves** ovate-oblong, crenate, stipule large and foliaceous. **Flowers** solitary axillary, pedicele long, zygomorphic. **Sepals** 5, free, appendiculate. **Petals** 5, spreading, violet coloured with streakes of different coloures (dominance of violet colour is not necessary, the dominant pigments varies from variety to variety), anterior spurred or saccate at base. **Stamens** 5, forming a ring around the ovary; filaments very short. **Gynoceium** 3-carpellary, syncarpous, 1-celled; many ovules on 3-parietal placentae. **Stigma** swollen. **Fruit** capsule.

Cultivated in gardens as an ornamental herb.

Flowering: December-February; **Fruiting:** February-March.

Siddiqui 31991, Inspection House.

XIII. FLACOURTIACEAE

Flacourtia L'Herit.

Flacourtia indica (Burm. f.) Merr. Interp. Herb. Amb. 377, 1917; Sleumer in Fl. Males. Ser. I. 5(1):76, 1954; FPP. 21, 1978.

Gmelina indica Burm. f. Fl. Ind. 132. t. 39. f. 5, 1768.

Flacourtia ramontchia L'Herit. Strip. Nov. 59. t. 30, 1786; FBI. 1:193, 1872; FUGP. 2:57, Repr. ed. 1960.

A deciduous polymorphous shrub or small tree. **Stem** awned with spines. **Bark** light-grey, exfoliating in thin flakes. **Leaves** variable in size, shape and texture; usually broadly, ovate, crenate, serrate, glabrous above, pubescent beneath. **Flowers** in terminal racemes, yellow, pedicellate. **Sepals** 4-6, ovate, hispid. **Male flowers** many, free; anthers 2-celled, dehiscing lengthwise. **Female flowers** ovary seated on an entire glandular disk; 4-8 celled, parietal placentae; style 4-8, shortly connate. **Stigma** 5-11. **Fruit** globose-ellipsoid, deep scarlet-red. **Seeds** 8-16 rugose.

Commonly along road sides ditches.

Ethnobotanical uses:

Leaves are astringent, stomachic, diaphoretic, antiperiodic, carminative and expectorant. The dried leaves or their juice are given in asthma, bronchitis, cattarrh of the bladder, dysentery, dirrhoea. Decoction of the leaves used in diabetes.

Flowering : March-April; **Fruiting:** May-June.

Local Name: 'Kannura'

Siddiqui 3120, Khera

XIV. POLYGALACEAE

Polygala Linn.

Key to species:

Wings petioled; racemes few flowered;
strophiole without appendages .....1. *P. erioptera*

Wings herbaceous; racemes dense flowered.....2. *P. arvensis*

1. **Polygala erioptera** DC. Prodr. 1:326, 1824; FBI. 1:203, 1875; FUGP. 1:60, Repr. ed. 1960.

Very variable in habit, erect or decumbent pluricaulous annual herb. **Leaves** obovate-linear, pubescent. **Flowers** in axillary or extra axillary, very short racemes, few flowered, pedicillate, yellow. **Sepals** 5, free, unequal, wings petaloid very oblique. **Petals** 3, two upper adnate, lower one navicular with a top crest. **Stamens** 8, monadelphous. **Capsule** ovate-oblong, compressed, distinctly notched, pubescent with persistent bracts. **Seeds** densely hairy, strophiole appendiculate.

Found rarely on sandy embankment of canals and cultivated fields.

Flowering: August-October; **Fruiting:** October-November.

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2. **Polygala arvensis** Willd. Sp. Pl. ed. 3. 2:876, 1802; Burtt. Notes. Royl. Bot. Edinb. 32:404, 1973; HFDD. 67, 1977.

Polygala chinensis auct. pl. (non Linn. 1753); Bennett, FBI. 2:204, 1876; [excl. var. *brachystachya* (BI) Bennett]; Chodf. Mem. Soc. Phys. Hist. Nat. Geneva Suppl. 2:385, 1893 (excl. Syn.

Polygala tranquebarica Mart., *Polygala brachystachya* BI); FUGP. 1:60, Repr. ed. 1960; Mukerjee, Bull. Bot. Soc. Beng. 12:46, 1958; Blumea, 14:269, 1966.

A medium sized, annual herbs, branched or unbranched. **Stem** with short hairs. **Leaves** quite variable in shape and size, from oblong, obovate to lanceolate, acute, mucronate. **Racemes** short, lateral or leaf-opposed. **Flowers** shortly pedicelled; bracteate. **Sepals** 5, free, 2-linear falcate-ovate-elliptic; outer ovate, sharply acuminate. **Petals** 2, upper adnate to staminal tube; keeled with a bearded crest. **Capsule** orbicular-oblong, notched and oblique at apex. **Seeds** black with 3-lobed caruncles.

Not common found in grassy localities.

Flowering: August-September; **Fruiting:** October-November.

Siddiqui 31442, Kahoura.

XV. CARYOPHYLLACEAE

Key to Genera:

Plant grown for ornamental purposes.

Limb of the petals fimbriate; calyx fused to form a tube .....1. *Dianthus*

Limb of petals not fimbriate; calyx divided upto base .....2. *Gypsophylla*

Plants growing wild.

Flowers pink.

Calyx angular; plants extensively dichotomously branched .....3. *Vaccaria*

Calyx not angular, inflated in fruit, many nerved; plants simple or sparsely branched .....4. *Silene*

Flowers white (in *Polycarpaea* first pink then silvery-white).

Leaves linear.

Seeds winged .....5. *Spergularia*

Seeds not winged .....6. *Polycarpaea*

Leaves broad.

Plants prostrate or ascending, flowers subsessile, root stout.....7. *Polycarpon*

Plants ascending, flowers

distinctly pedicelled, root cylinder.

Petals divided upto base.....8. *Stellaria*

Petals undivided .....9. *Arenaria*

1. **Dianthus** Linn.

Dianthus chinensis Linn. Sp. Pl. 411, 1753; Man. Cult. Pl. ed. 2. 375, 1949; HFDD. 71, 1977.

An erect glabrous herb. **Leaves** sessile, entire, acute. **Flowers** of different colours, ranging from white to dark-red and with a dark coloured centre. **Epicalyx** present. **Petals** free, limb dentate-laciniate. **Capsule** 2-2.2 cm long. **Seeds** smooth.

A very popular annual of spring season. Planted in pots, beds and sometimes found as an escape.

Dianthus barbatus Linn. and *Dianthus caryophyllus* Linn. also cultivated as an ornamental.

Flowering: November-February; **Fruiting:** February-April.

Siddiqui 31990, Inspection House.

2. **Gypsophylla** Linn.

Gypsophylla elegans Bieb. Man. Cult. Pl. 381, 1949.

An upright annual herb. **Stem** extensively dichotomously branched, glabrous. **Leaves** subsessile, lanceolate, entire, acute. **Flowers** on long file from pedicels, white. **Sepals** divided down nearly to base, acute, margins scarious. **Petals** much longer than the sepals, emarginate.

Planted in rockeries, beds and pots. Also found as an escape.

FLowering: December-February; **Fruiting:** February-April.
Siddiqui 31997, D.M. Lodge.

3. **Vaccaria** Medik.

Vaccaria pyramidata Medik. Phil. Bot. 1:96, 1789; Cuffodontis in Bull. Jard. Bot. Brux. Suppl. 23:104, 1953; FPP. 25, 1978.

Saponaria vaccaria Linn. Sp. Pl. 409, 1753; FBI. 1:217, 1874; FUGP. 1:62, Repr. ed. 1960.

Erect, glabrous, corymbosely branched herb. **Leaves** sessile, entire, cordate. **Flowers** pedicelled in dichasial cymes, red or pink. **Sepals** 5, fused. **Petals** 5, free, retuse, longer than the sepals. **Stamens** 10, biseriate, filaments shorter, filiform; anthers 2-celled, dorsifixed. **Capsule** ovoid-globose with persistent calyx. **Seeds** blackish, angled, globose.

Often found in wheat fields in winter season.

Flowering: January-February; **Fruiting:** April-May.
Siddiqui 31205, Khera.

4. **Silene** Linn.

Silene conoidea *Linn. Sp. Pl. 418, 1753; FBI. 1:218, 1875; FUGP.* 1:65, Repr. ed. 1960; Choudhary Notes Roy. Bot. Gard. Edinb. 22:250, 1957; HFDD. 73, 1977.

Erect, dichotomously branched, gland pubescent annual. **Leaves** lanceolate-oblong, acute, opposite, hairy. **Flowers** solitary axillary. **Calyx** 5, also tubular in young flowers but becomes

inflated as the flower grows and is quite inflated in fruits; teeth 1/3rd the length of the tube. **Petals** 5, free, pink, claw auricled at the junction with limb. **Stamens** 1Ø, two series; anthers 2-celled longitudinally dehiscence. **Capsule** sessile, ovoid, with long beak and there are three prominent depressions around the base of beak, crustaceous, shining. **Seeds** reniform, greyish-brown, tuberculate, 6-ribbed.

Fairly common in cultivated fields and grass-lands etc.

Flowering: January-March; **Fruiting:** April.
Siddiqui 31223, Etouli.

Plants associated: *Anagalis arvensis*, *Heliotropium marifolium*, *Ageratum conyzoides* etc.

5. **Spergularia** (Pers.) J. et. C. Presl.

Spergularia fallax Lowe in Hook. f. Kew Journ. Bot. 8:289, 1856; Babu in Bull. Bot. Surv. Ind. 9(1-4):277, 1967.

Spergula arvensis Linn. Sp. Pl. 45Ø, 1753; FBI. 1:243, 1875; FUGP. 1:63, Repr. ed. 196Ø.

Spergula fallax (Lowe) Krause in Sturm. Fl. Deutsch. ed. 2. 2:19, 19Ø1; Mile-Redhead in Kew Bull. 195Ø:338, 195Ø; Burt. & Lewis in Kew Bull. 1952:349, 1952.

Arenaria flaccida Roxb. Fl. Ind. 3:447, 1832 (non Clairv. 1811).

Spergula pentandra Linn. var. *intermedia* Boiss. Diagn. Ser. 2. 1:93, 1853; Fl. Orient. 1:731, 1867.

Spergula flaccida (Roxb.) Aschers. in Verb. Bot. Vern. Brand.

30:153, 1889.

Spergula pentandra sensu Edgew. & HK. f. in FBI. 1:243, 1874; pro parte (non Linn. 1753); FUGP. 1:67, Repr. ed. 1960.

A glabrous, green herb, quite variable in size depending on the habitat. **Leaves** linear, flat, obtuse, stipulate. **Flowers** white in lax terminal dichasial cymes, pedicelled. **Sepals** 5, free, ovate, scarious margined and longer than the petals. **Petals** 5, free, white, subobtuse. **Stamens** 8, free; anthers yellow, 2-celled. **Capsule** 3-valved, ovoid, many seeded. **Seeds** granulate winged.

Commonly found on waste places.

Flowering: January-March; **Fruiting:** March-April.

Siddiqui 31234, Kundouli.

Plants associated: *Stellaria media*,*Commelina benghalensis*, *Tridax procumbens*, *Eclipta prostrata* etc.

6. **Polycarpaea** Lamk.

Polycarpaea corymbosa (Linn.) Lamk. Tabl. Encycl. III 12:129, 1797; FBI. 1:255, 1875; FUGP. 1:65, Repr. ed. 1960.

Achyranthes corymbose Linn. Sp. Pl. 205, 1753.

Erect branched herb. **Stem** hairy, erect, slender. **Leaves** linear, opposite, crowded, stipulate. **Flowers** pink in dichasial terminal cymes, inflorescence turns silvery-white on maturation. **Sepals** 5, linear, lanceolate, scarious, persistent. **Petals** 5, smaller than the sepals. **Stamens** 5; anthers 2-celled, globose. **Style** 1; stigma 3-fid. **Fruit** 3-valved. **Capsule** enclosed in calyx.

Generally occur on sandy soil of river side and cultivated fields.

Flowering: August-November; **Fruiting:** December.

Siddiqui 31461, Gulamau.

7. **Polycarpon** Loeff. ex Linn.

Polycarpon prostratum (Forsk.) Aschers. & Schweinf. Oesterr. Bot. 2. 39:128, 1889; Milne-Redhead Kew Bull. 451, 1948; HFDD. 72, 1977.

Alsine prostrata Forsk. Fl. Aegypt- Arab. 207, 1775 (non Del. 1813).

Pharnaceum depressum Linn. Mant. Pl. 2:562, 1771 (non *Polycarpon depressum* Nutt. ex Torr. & Gray. 1838).

Loeflingia indica Retz. Observ. 4:8, 1786.

Polycarpon indicum (Retz.) Merr. Philipp. Journ. Sci. 10:302, 1915; Mizushima, Journ. Jap. Bot. 38:151, 1963.

Polycarpon loeflingii Benth. & Hook. f. Gen. Pl. 1:153, 1862; FBI. 1:245, 1874; FUGP. 1:65, Repr. ed. 1960.

Polycarpaea memphitica Del. Descr. Egypt. Hist. Nat. 2:211 t. 24. f. 2, 1913.

A prostrate herb with a very stout tape root. **Stem** clothes with simple or branched hairs. **Leaves** shortly petaloid, obovate-lanceolate, quite variable. **Flowers** in dense dichotomous cymes, crowded towards the ends of branches. **Sepals** linear-oblong, fleshy, obtusely keeled on the back. **Petals** white, smaller than the sepals, notched or truncate at the apex. **Stamens** 3; style 1, 3-partite. **Capsule** ovoid. **Seeds** pale-brown, minutely tuberculate.

Found in shady moist as well as dry places.

Flowering: April-June; **Fruiting:** August-October.

Siddiqui 31314, Asgaon.

Plants associated: *Indigofera* sp., *Eclipta prostrata*, *Sonchus arvensis*, *Phyla nodiflora*, *Polygonum plebeium*, *Setaria glauca* etc.

8. **Stellaria** Linn.

Stellaria media (Linn.) Vill. Hist. Pl. Dauph. 3:615, 1789; FBI. 1:203, 1875; FUGP. 1:66, Repr. ed. 1960.

Alsine media Linn. Sp. Pl. 272, 1753.

An ascending herb. Each internode with a line of hair on alternate sides. **Leaves** lower petioled; upper sessile, ovate-elliptic to oblong. **Flowers** greenish-white, solitary or in leafy cymes; long pedicelled, pedicel elongate as the flower matures. **Sepals** ovate-lanceolate to oblong, obtuse. **Petals** deeply 2-fid, shorter than the sepals, white. **Stamens** usually 8; anthers 2-celled, dorsifixed. **Style** 3. **Capsule** ovoid, within persistent calyx. **Seeds** reddish-brown, tuberculate.

Abundant in cultivated as well waste lands. In shady and moist situations it forms a dense vegetations.

Flowering: January-February; **Fruiting:** March-April.

Siddiqui 31224, Etouli.

Plants associated: *Spergularia fallax*, *Justicia simplex*, *Nepeta hindostana*, *Chenopodium album*, *Primula umbellata* etc.

9. **Arenaria** Linn.

Arenaria serpyllifolia Linn. Sp. Pl. 423, 1753; FBI. 1:239, 1875;

FUGP. 1:63, Repr. ed. 1960 var. *serpyllifolia* McNeill, Notes Roy. Bot. Gard. Edinb. 24:285 1963; HFDD. 71, 1977.

The plant differs from *Stellaria media* in being smaller, darker in colour, glandular hairy and having entire petals 5. Stamens 10 and dark brown seeds.

Commonly occur in cultivated fields, grass-lands under shades.

Flowering: February-March; **Fruiting:** April.

Siddiqui 31251, Jhala.

XVI. PORTULACACEAE

Portulaca Linn.

Key to species:

Stem nodes covered with hairs; flowers red or various coloured.

Nodes densely hairy, flowers red-purple .....1. *P. pilosa*

Nodes sparsely hairy, flowers yellow or variously coloured.

Flowers solitary .....2. *P. grandiflora*

Flowers in clusters .....3. *P. quadrifida*

Stem nodes not hairy or with few hairs on young stem; flowers yellow .....4. *P. oleraceae*

1. **Potulaca pilosa** Linn. Sp. Pl. 445, 1753; Poellnitz, Fedde Reprt. 37:240-320, 1934; Ibid. 15:99, 1941; HFDD. 77, 1977.

A prostrate or decumbent-ascending annual herb. **Stem** often much branched, nodes covered with long hairs. **Leaves** densely crowded, lanceolate-oblong, acute, succulant. **Flowers** solitary or few within an involucre, pink, purple. **Stamens** 10-30; anthers 2-celled, globular. **Ovary** semi-inferior; many ovuled; style 5-fid. **Capsule** dehiscing transversely. **Seeds** globose, rugose, dark-brown.

Common in the grasses in shady and moist localities.

Flowering: April-June; **Fruiting:** May-August.

Siddiqui 31950, Hardoi.

2. **Portulaca grandiflora** Hook. in Bot. Mag. t. 2885, 1929; Man. Cult. Pl. 365, 1949.

Often much branched, annual herb, decumbent or ascending. **Leaves** densely crowded, linear subulate, acute or obtuse. **Flowers** red, rose-yellow, pink or white. **Sepals** 2, free, ovate, keeled at the apex. **Petals** 5, rarely 6, variously coloured, broadly obovate. **Stamens** numerous; style branches 5-9. **Capsule** circumsescile. **Seeds** globose, reniform, golden-black, tubercled.

Cultivated in beds or parks, often becomes escape in waste places and fields.

Flowering: April-June; **Fruiting:** May-August.

Siddiqui 31928, Chhatriya College.

3. **Portulaca quadrifida** Linn. Mant. 1:73, 1767; FBI. 1:247, 1875; FUGP. 1:66, Repr. ed. 1960.

A slender, extensively branched annual herb, rooting at the nodes. **Stem** narrow, terete, tinged with purple. **Leaves** subsessile, narrowly oblong. **Sepals** 2, connate. **Petals** 4, oblong, slightly connate at the base, bright-yellow. **Stamens** 7-10. Ovary semi-inferior; style branches 3-4. **Fruit** capsule, conical at the base. **Seeds** many, reniform, dark-brown.

A common weed in partially shades dry soils of garden and rosd sides.

Ethnobotanical uses:

Plant and seeds are recommended in diseases of kidney, bladder and lungs. Juice of the stem is valuable dressing for soothing

the itching of prickly heat. Seeds are also used in diarrhoea and dysentery.

Flowering & Fruiting: August-October.

Local Name: 'Bari-launia'

Siddiqui 31439, Kahoura.

4. **Portulaca oleraceae** Linn. Sp. Pl. 445, 1753; FBI. 1:246, 1874; FUGP. 1:66, Repr. ed. 1960; Poellnitz, Fedde, Repert. 37:240-320, 1934; Ibid. 50:97, 1941; HFDD. 77, 1977.

A prostrate or decumbent annual, fleshy herb. **Stem** terete, green or reddish-brown. **Leaves** sessile or subsessile, oval-obovate, spathulate. **Flowers** usually in clusters of 2-5 or solitary sessile, subtended by an involucral. **Sepals** 2, keeled on the back. **Petals** 5, yellow, oblong-obovate, erect. **Stamens** 7-12; style 3-5 fid. **Capsule** dehiscing above the base. **Seeds** reniform, black, granulate.

Abundant on road sides and old building walls.

Ethnobotanical uses:

The leaves are astringent, refrigerant, diuretic and emollient, also used in dysuria. Leaf juice is used in spitting of blood. It is also used in burns, scalds and many skin diseases.

Flowering & Fruiting: March-Mid July.

Local Name: 'Kulfa'

Siddiqui 31291, Jhala.

XVII. TAMARICACEAE

Tamarix Linn.

Tamarix dioica Roxb. Hort. Beng. 22, 1814; FBI. 1:249, 1878; FUGP. 1:68, Repr. ed. 1960; Ind. Tr. 46, Repr. ed. 1971; FPP. 27, 1978.

A medium sized shrub with drooping branches. **Bark** dark-brown. **Leaves** sheathing; tips acuminate, margins scarious. **Flowers** dioecious, pentamerous, light pink in dense peduncled spikes running into terminal penicles; bracts persistent, scaly. **Sepals** 5, scarious elliptic-ovate. **Petals** 5, free, pink. **Stamens** 5, inserted between the lobes of 5-lobed disk; anthers distinctly apiculate, extrorse, filament ligulate; reduced to staminodes with broad sagittate anthers in female flowers. **Style** 3-4, short. **Fruit** loculicidal capsule, marcescent sepals and petals surrounding it near the base. **Seeds** with tuft of hairs at apex.

Common on the dry bank of the river.

Ethnobotanical uses:

Dried leaves powder mixed with Gur (solidified sugarcane juice) is used in diarrhoea and dysentery. Leaves mixed with *Ficus carpica* and fermented sugarcane juice, prepared the paste. This paste is applied over the tumour for three hours. The bark of the twig is astringent and laxative.

Flowering: May-August; **Fruiting:** September-October.

Local Name: 'Jhau'

Siddiqui 31335, Near Gomti river.

XVIII. ELATINACEAE

Bergia Linn.

Bergia ammannioides Heyne ex Roth, Nov. Pl. Sp. 219, 1821; Roxb. (Hort. Beng. 34, 1814, nom. nud.); Fl. Ind. ed. Carey 2:456, 1832; FBI. 1:251, 1874; FUGP. 1:69, Repr. ed. 1960.

Lechea verticillata Willd. Sp. Pl. 1:495, 1797 (non *Bergia verticillata* Willd. 1799).

Prostrate or decumbent-ascending, glandular-pubescent, annual herbs, often suffused with reddish-purple, with a woody base. **Leaves** simple, stipulate, elliptic-oblong or obovate-oblong, gland ciliate. **Flowers** crowded in dense axillary fascicles, 5-merous. **Sepals** 5, glandular, pubescent, 0.3-0.4 cm long. **Petals** as many as sepals, rose coloured, equal to or shorter than the sepals. **Stamens** 5. **Carpels** 5, ovary superior. **Capsule** ovoid, 2 mm across. **Seeds** many dark-brown, reticulate.

Abundant in moist localities.

Flowering: Late October; **Fruiting:** April-May.

Siddiqui 31523, Saktapur.

XIX. DIPTEROCARPACEAE

Shorea Roxb.

Shorea robusta Gaertn. f. Fruct. 3:48. t. 186, 1805; FBI. 1:306, 1875; Ind. Tr. 69, Repr. ed. 1971; FUGP. 1:71, Repr. ed. 1960; FPP. 28, 1978.

A large heavy wooded tree. **Bark** dark-brown. **Leaves** ovate-oblong large acuminate, obtuse, glabrous (when full grown) stipules caducous; petiole 1.2-2.0 cm long. **Flowers** yellowish in terminal and axillary racemose. **Calyx** lobes ovate, longer than the tube, pubescent. **Petals** pale-yellow, oblong-lanceolate, longer than the calyx, pubescent externally. **Stamens** upto 50 in several series, much shorter than the petals; filaments dilated at the base; connective subulate. **Ovary** 3-celled. **Style** persistent in the fruit like a beak. **Fruit** winged; wings oblong or spathulate, 10-15 parallel nerved, 4-6 cm long.

Occassionally found near villages.

Ethnobotanical uses:

Gum that exudes from the stem is astringent, aphrodisiac and stimulant; it is also given in dysentery, bleeding piles, weak digestion and gonorrhoea. It is given with honey or sugar as an aphrodisiac.

Flowering: March-July; **Fruiting:** March-July.

Local Name: 'Sakhu'

Siddiqui 31235, Kundouli.

XX. MALVACEAE

Key to Genera:

Leaves rounded in outline (not palmati-
-partite).

Tree with oblong-spathulate bracteoles and white flowers .....1. *Kydia*

Herbs.

A prostrate-ascending herb;leaves long petioled; flowers small, sessile, axillary; corolla hardly exceeding the calyx, lilac; fruit not spinous .....2. *Malva*

Erect herbs; corolla pink-red, exceeding the calyx; fruit with hooked bristles .....3. *Urena*

Leaves otherwise.

Leaves palmately divided.

Seeds covered with long silky hairs .....4. *Gossypium*

Seeds not as above.

Calyx spathaceous, caducous; staminal tube antheriferous throughout .....5. *Abelmoschus*

Calyx campanulate or cupular

persistent; only upper half

of staminaltube antherferous.....6. *Hibiscus*

Leaves not divided.

Fruit strongly ribbed .....7. *Abutilon*

Fruit not ribbed.

Bracteoles none .....8. *Sida*

Bracteoles three .....9. *Malvastrum*

1. **Kydia** Roxb.

Kydia calycina Roxb. Hort. Beng. 51, 1814; Pl. Cor. 3:12. t. 215, 1819; FBI. 1:348, 1875; Ind. Tr. 78, Repr. ed. 1971; FUGP. 1:92, Repr. ed. 196Ø; FPP. 36, 1978.

A medium sized deciduous tree. **Bark** grey. **Herbaceous parts** with stellately hairs. **Leaves** 5-7 nerved, cordate, brownish-black above (when ripe) and pale beneath, long petioled, stipules caducous, spathulate. **Flowers** white, polygamous, axillary and terminal dense panicles. **Bracteoles** oblong-spathulate, 4-6 accrescent. **Calyx** lobes 5, accrescent, rusty tomentose. **Petals** white or pinkish, clothed adnate to the staminal tube, ovate exceeding the calyx. **Stamens** monadelphous, staminal tube divided into 5 branches bearing 3-5 sessile anthers. **Capsule** 3-valved. **Seeds** reniform, oblique, striate.

Sometimes planted as avenue tree.

Flowering: July-October; **Fruiting:** December-February.

Siddiqui 31421, Bhulbhuliya.

2. **Malva** Linn.

Malva parviflora Linn. in Hojer. Demonstr. Pl. Hort. Ups. 18, 1753; Amoen. Acad. 3:460, 1756; Sp. Pl. ed. 2:969, 1763; Borss, Blumea, 14:149, 1966; FUGP. 1:74, Repr. ed. 1960; HFDD. 88. 1977.

Prostrate or decumbent annual herb. **Leaves** broadly ovate-orbicular, cordate, crenate, dentate, long petioled. **Flowers** white in sessile axillary clusters. **Bracteoles** 3, linear. **Sepals** 5, forming a tube, persistent. **Petals** 5, free, slightly connate at the base, emarginate, white, hardly exceeding the calyx. **Carpels** 8-12; ovary 8-12 celled with one ovule in each cell. **Style** as many as the carpels. **Seeds** subreniform, dark-brown.

Abundant in road sides ditches and shady localities.

Flowering: January-March; **Fruiting:** March-May.
Siddiqui 31203, Khera.

3. **Urena** Linn.

Urena lobata Linn. Sp. Pl. 692, 1753; FBI. 1:329, 1874; FUGP. 1:80, Repr. ed. 1960; Hu, Fl. China Fam. 153. 73, 1955; HFDD. 93, 1977.

An erect stellate tomentose herb or undershrub. **Leaves** ovate-orbicular; lower angular, upper entire; nerves 6-8. **Flowers** rosy-pink in axillary clusters. **Bracteoles** 5, adnate to calyx. **Sepals** 5, connate, lobes ovate, acute, persistent. **Petals** free, basally connate, much exceeding the calyx. **Staminal tube** 1.5 cm long. **Fruit** separating from the axis into 5 mericarps, covered with light brown, hooked bristles. **Seeds** reniform with a

conspicuous scar, dark-brown.

Very common in waste-lands, road sides and among hedges.

Flowering: July-November; **Fruiting:** October-January.

Siddiqui 31405, Raro.

4. **Gossypium** Linn.

Key to species:

Flowers red-purple .....1. *G. arboreum*

Flowers pale-yellow .....2. *G. hirsutum*

1. **Gossypium arboreum** Linn. (Sp. Pl. 693, 1753) emend. Hutch. *et al* Evol. Goss. 32. t. 4, 1957; Borss. Blumea 14:121, 1966; HFDD. 85, 1977.

An erect bushy perennial shrub, nearly all parts hirsut with stellate hairs. **Leaves** palmatifid, lobes 3-5, ovate, oblong, acuminate. **Flowers** large, red-purple. **Bracteoles** 3, connate. **Calyx** cupular, truncate, 5-lobed with 3 nectaries at the base. **Capsule** ovoid to globular, glabrous. **Seeds** ovoid to globular.

Often found in gardens sometimes as an escape.

Flowering: August-September; **Fruiting:** October.

Siddiqui 31451, Charouli.

2. **Gossypium hirsutum** Linn. Sp. Pl. ed. 2. 975, 1753; Roberty, Candollea 13:55, 1950; Hu, Fl. China Fam. 153. 66, 1955; Borss. Blumea 14:123, 1966; Fryxell, Brittonia, 20:380, 1968; HFDD. 86, 1977.

Erect much branched, shruby herb. **Hairs** confined to petioles,

nerves and pedicel etc. otherwise glabrous. **Leaves** palmatifid, lobes 3-5, balck punctate. **Flowers** yellow. **Bracteoles** 3, free pectinate, 3-5 across. **Fruit** 4-5 valved capsule, beaked, glandular pitted.

Occassionally cultivated in fields.

Flowering: August-September; **Fruiting:** October-November.

Siddiqui 31456, Charouli.

5. **Abelmoschus** Medik.

Key to species:

Fruit elongated fusiform .....1. *A. esculentus*

Fruit ovoid to oblong .....2. *A. moschatus*

1. **Abelmoschus esculentus** (Linn.) Moench. Meth. Pl. 617, 1974; Hochr. Condallea 2:86, 1924; HFDD. 81, 1977.

Hibiscus esculentus Linn. Sp. Pl. 696, 1753; FBI. 1:343, 1874; FUGP. 1:87, Repr. ed. 1960.

Erect hispid herb. **Stem** woody at the base. **Leaves** 3-5 lobed with oblong-lanceolate lobes, coarsely dentate, serrate. **Flowers** yellow with crimson centre, solitary axillary. **Fruit** long, fusiform. **Capsule** upto 25 cm long, loculicidal, ribbed. **Seeds** black, ovoid reniform.

An important vegetable crop and extensively cultivated for the sake of food.

Flowering: June-November; **Fruiting:** July-December.

Siddiqui 31943, Hardoi.

2. **Abelmoschus moschatus** Medik. Malv. 46, 1787; Blumea 14:90, 1966; HFDD. 82, 1977.

Hibiscus abelmoschus Linn. Sp. Pl. 696, 1753; FBI. 1:342, 1874; FUGP. 1:87, Repr. ed. 1960.

An erect hispid herb. **Leaves** broadly ovate-orbicular, 5-angled. **Flowers** yellow with crimson centre, solitary axillary or in short terminal racemes, nodding. **Bracteoles** 7-10, linear. **Sepals** 5, densely pilose. **Staminal tube** antheriferous almost throughout its length. **Fruit** ovoid-oblong, loculicidal. **Capsule** hispid. **Seeds** subglobose, reniform with scars.

Rare, occassionally found growing among road sides ditches.

Flowering: October-December; **Fruiting:** November-January.

Siddiqui 3150l, Kahoura.

6. **Hibiscus** Linn., nom. cons. prop.

Key to species:

Epicalyx minute; flowers pure white or cream.....1. *H. lobatus*

Epicalyx well developed; flowers yellow with crimson centre.

Epicalyx 5-8, free from the calyx; each sepal without gland at the back .....2. *H. vitifolius*

Epicalyx 7-10, adnate to calyx near the base; each sepal with gland at the back.....3. *H. cannabinus*

1. **Hibiscus lobatus** (Murv.) O. Kuntze, Rev. Gen. Pl. 3:2. 19, 1898; Exell, Fl. Zamb. 1:445. t. 89. f. 1, 1961; Borss. Blumea

14:77, 1976; HFDD. 87, 1977.

Solandra lobata Murr. Comm. Soc. Reg. Sci. Geotting, 6:20. t. 1, 1785; Cav. Diss. 2:55, 1786; Ibid. 5:279. t. 136. f. 1, 1788.

Lagunaea lobata (Murr.) Willd. Sp. Pl. 3:773, 1800.

Hibiscus solandra L'Herit. Strit. Nov. 103. t. 49, 1788; FBI. 1:336, 1874; FUGP. 1:84, Repr ed. 1960.

An erect, simple or slightly branched glabriscent or stellate-pubescent, annual herb. **Leaves** lower simple, upper palmately lobed; margins serrate, both the surfaces hispid hairy; petiole longer than the blade. **Flowers** white, solitary axillary. **Calyx** 5-lobed; lobes divided half way down. **Sepals** keeled, gland hairy, upper 1/3rd part hairy inside. **Petals** cream-yellow, obovate, entire. **Fruit** loculicidal capsule. **Seeds** black, glabrous.

Common in waste places, among under growth in orchards.

Flowering: July-September; **Fruiting:** October-November.
Siddiqui 3140⌀6, Raro.

This species of *Hibiscus* can be readily identified, when freshly pressed, since the fresh specimen sticks to the paper due to the glandular hairs.

2. **Hibiscus vitifolius** Linn. Sp. Pl. 696, 1753; FBI. 1:338, 1874; FUGP. 1:85, Repr. ed. 1960; HFDD. 88, 1977.

An erect under shrub. **Stem** faintly striate and slightly hairy. **Leaves** ovate-cordate, 3-5 palmately lobed; lobes oblong-lanceolate, serrate. **Flowers** yellow, solitary, axillary or in terminal nodding racemes. **Bracteoles** 5-8, filiform. **Calyx** 5,

connate into cupular calyx tube, hairy outside. **Petals** 5, free, basally connate, bright yellow with purple base. **Fruit** loculicidal capsule, subulately-acuminate, 5-lobed, hairy. **Seeds** ovoid, reniform, scar distinct, finely tuberculate, dark-brown.

Often found in fields.

Flowering: September-November; **Fruiting:** October-December.

Siddiqui 31491, Sadai behta.

3. **Hibiscus cannabinus** Linn. Syst. Nat. ed. 10. 2:1149, 1759; FBI. 1:339, 1874; FUGP. 1:85, Repr. ed. 1960; Hu, Fl. China Fam. 153:58, 1955; Bates, Baileya 13:83. f. 23d. 1965; Borss. Blumea 14:63, 1966; HFDD. 87, 1977.

Annual under shrub. **Stem** erect, spiny. **Leaves** 3-5 lobed, glandular at the base. **Flowers** pale-yellow, centre purple, solitary axillary. **Bracteoles** 7-10. **Sepals** each sepal with a gland at the back. **Fruit** a globose, bristly capsule, prominently beaked. **Seeds** ovoid-reniform, dark-brown.

Cultivated for the fibers extracted from its stem.

Ethnobotanical uses:

Juice of the flowers mixed with sugar and black pepper is a remedy for biliousness. Seeds are afrodisiac.

Flowering : August-October; **Fruiting:** November.

Local Name: 'Patsan'

Siddiqui, 31457, Charouli.

The following species of *Hibiscus* are also cultivated as an ornamental purposes in the area.

1. **Hibiscus rosa-sinensis** Linn.

Large shrub, old stem lenticellar. **Leaves** ovate, dentate, shining above, stipules linear. **Flowers** axillary. **Calyx** forming a tube. **Petals** 5, red, recurved. **Staminal tube** long, equalling or longer than the corolla; antheriferous in upper parts only. **Style** 1, encircled by staminal tube; stigma 5-6, capitate, velvety-red.

Flowering: Round the year; **Fruiting:** Not seen.

2. **Hibiscus mutabilis** Linn.

A large shrub with orbicular palmately lobed leaves; flowers white turning to pink; in terminal clusters.

Flowering & Fruiting: October-April.

3. **Hibiscus subdariffa** Linn.

Cultivated for its fleshy, acid sepals.

7. **Abutilon** Mill.

Abutilon indicum (Linn.) Sweet, Hort. Brit. 54, 1827; FBI. 1:326, 1874; FUGP. 1:78, Repr. ed. 1960; Parker, For. Pl. 37; Fl. Delhi 75, 1963; FPP. 31, 1978.

Sida indica Linn. Cent. Pl. 2:26, 1756.

An erect shrub, clothed with stellate and long. simple hairs. **Leaves** ovate-cordate, irregularly and coarsely toothed, petiolate. **Flowers** solitary axillary, yellow or orange-yellow. **Sepals** 5, connate, downy. **Petals** 5, prominentely veined; corrugated. **Fruit** strong ribbed. **Seeds** dark-brown, compressed, reniform, stellately hairy.

Abundant on road sides and in waste palces.

Ethnobotanical uses:

The leaves are useful as a demolcent, their decoction is given in diarrhoea, gonorrhoea, bronchitis, inflammation of bladder, chest affections, urethritis and fever. Bark as well as root are diuretic.

Flowering & Fruiting: Round the year.

Local Name: 'Kanghi'

Siddiqui 31204, Khera.

8. Seda Linn.

Key to species:

A procumbent trailing herb, hispid hairy.....1. *S. cordata*

Erect herb or small shrub.

Carpels 5, petioles with recurved spines at the base .....2. *S. spinosa*

Carpels more than 5, petioles without spines.

Leaves rhomboid - lanceolate, hairy beneath .....3. *S. rhombifolia*

Leaves cordate-oblong, downy on both surfaces .....4. *S. cordifolia*

1. Sida cordata (Burm. f.) Borss. Blumea 14:182, 1966; HFDD. 91, 1977.

Melochia cordata Burm. f. Fl. Ind. 143, 1768.

Sida veronicifolia Lamk. Encycl. 1:5, 1783 (*Veronicaefolia*); FUGP. 1:75, Repr. ed. 1960.

Sida humilis Cav. Diss. 5:227, t. 936. f. 2, 1788; FBI. 1:322, 1874.

Trailing weak herb sometimes suffused with black. **Leaves** ovate-cordate; margins crenate, 2.0-6.0 cm long. **Flowers** solitary axillary orange-yellow. **Sepals** 5, connate, hairy. **Petals** 5, basally connate. **Staminal tube** shorter than the corolla. **Carpels** 5, awned, mericarps awned. **Seeds** rounded, triangular, brown, black dotted.

Abundant in waste places, among hedges and sometimes grown on walls.

Flowering: July-November; **Fruiting:** October-December.

Siddiqui 3140?, Raro.

2. **Sida spinosa** Linn. Sp. Pl. 683, 1753; FBI. 1:323, (excl. Syn. *Sida alnifolia* Linn.); FUGP. 1:76, Repr. ed. 1960; Parker, For. Pl. 34, 1924; Fl. Delhi 74, 1963; FPP. 39, 1978.

Sida alba Linn. Sp. Pl. 960, 1763.

A suberect herb, stellately pubescent. **Leaves** ovate, oblong, crenate, shortly petioled, usually with spiny tubercles at the base. **Flowers** solitary axillary, pale-yellow. **Sepals** 5, connate, longitudinally ribbed. **Petals** 5, shortly connate at the base. **Staminal tube** divided into many antheriferous filaments. **Carpels** 5, connate. **Fruit** ovoid, capsule, each mericarp tipped with 2-hispid thorns.

Often found on road sides.

Ethnobotanical uses:

Roots are used in nervous, urinary diseases and in fever. Root bark is beaten up with milk and sugar is used as tonic and astringent. Root juice is used to promote the healing of wounds and gonorrhoea.

Flowering : September-November; **Fruiting:** October-December.

Local Name: 'Bariara'

Siddiqui 31491, Sadai behta.

3. Sida rhombifolia Linn. Sp. Pl. ed. 2, 684, 1753; HFDD. 92, 1977.

An erect pubescent under shrub. **Leaves** shape and size variable, sometimes larger; lower leaves rhomboid-lanceolate, or broadly ovate or coarsely serrate, upper ones entire, glabriscent above, grey pubescent beneath; petiole short, stipules setaceous. **Flowers** on jointed peduncles, axillary or corymbosely clustered at the ends of branches. **Sepals** 5, connate; lobes triangular, hairy. **Petals** white or yellow, streaked. **Carpels** 7-10, awnes 2, short. **Capsule** stellate hairy, mericarp 5-10, smooth.

Often found along road sides and waste lands.

Flowering & Fruiting: August-December.

Siddiqui 31438, Kahoura.

4. Sida cordifolia Linn. Sp. Pl. 684, 1753; FBI. 1:324, 1874; FUGP. 1:77, Repr. ed. 1960; Fl. Delhi 95, 1963; HFDD. 91, 1977.

Erect herb. Stem much branched, hairy. **Leaves** oval-elliptic,

correlate at base, serrate-dentate tomentose on the both surfaces. **Flowers** solitary axillary, yellow. **Sepals** 5, connate. **Petals** 5, truncate, falcate. **Carpels** 10. **Fruit** ovoid-oblong, mericarps reticulately winged, 2-awned. **Seeds** rounded triangular, top truncate, dark-brown.

Often found in mango orchards.

Ethnobotanical uses:

Juice of the plant is given in rheumatism, gonorrhoea and spermatrrhoea; its infusion is also given in rheumatism. A puoltice of leaves is applied to boils. Roots are cooling, astringent, stomachic, nervine and cordate tonic. The root bark is given with milk and sugar in leucorrhoea, gonorrhoea and chronic dysentery.

Flowering & Fruiting: August-December.

Local Name: 'Khabranti'

Siddiqui 3146Ø, Gulamau.

9. **Malvastrum** Gray, nom. cons.

Malvastrum coromandelianum (Linn.) Garcke, in Bonplandia 5:295, 1857; Merr. Enum. 3. 33; Fl. Delhi 77, 1963; HFDD. 89, 1977.

Malva coromandeliana Linn. Sp. Pl. 687, 1753.

Malvastrum tricuspidatum (R. Br.) A. Gray, Pl. Wright. 1:16, 1852; FBI. 1:321, 1874; FUGP. 1:75, Repr. ed. 196Ø.

Erect branching herb, hairs attached in the middle and sometimes one or usually both the ends bifurcated. **Leaves** petiolate with very fine scattered hairy adaxially and on abaxially face hairs

only on veins and resemble those of stem morphologically; margins toothed; main lateral nerves 5-7 pairs. **Flowers** yellow, solitary axiallry. **Bracteoles** (epicalyx) 3. **Calyx** with 5 sepals, connate. **Petals** 5, longer than the sepals, orange-yellow. **Ripe carpel** dark-brown, hairy awned. **Seeds** reniform.

Abundant in nearly all types of terrestrial situations.

Flowering: June-November; **Fruiting:** October-January.

Siddiqui 313Ø3, Atwa.

XXI. BOMBACACEAE

Bombax Linn.

Bombax ceiba Linn. Sp. Pl. 511, 1753; (pro parte); A. Robyns in Taxon 10:6, 160, 1961 & in Bull. Jard. Bot. Etat. Brux. 33:88, 1963; FPP. 40, 1978.

Bombax malabaricum (DC.) Schott. & Endl. Melet. 35, 1832.

A large deciduous tree with straight trunk and whorled branches; trunk base buttressed. **Bark** ashy-grey; stem with conical prickles. **Leaves** palmate, leaflets 5-7, lanceolate, obovate, entire, subcoriaceous, common petiole equal to or longer than the leaflets. **Flowers** appear before leaf emergence, red. **Sepals** fleshy, silky and lusterous inside. **Petals** larger than the sepals, oblong-obovate, recurved, stellate pubescent externally. **Stamens** numerous, divided into 2 groups, the outer ones in 5 fascicles; the inner ones basally connate, 5 of them forked at the top and each branch bearing an anther (2-3 celled), remaining anthers 1-celled; anthers long and twisted later. **Ovary** 5-celled, densely pubescent; style 5-branched. **Capsule** oblong-ovoid, slightly angular, woody, 7-15 cm long white downy. **Seeds** glabrous embedded in white cottony mass.

Common throughout the area.

Ethnobotanical uses:

Paste of the bark is applied over skin eruptions. Seed paste is applied to the body in case of small pox and chicken pox to provide quick relief.

Flowering : January-March; **Fruiting:** April-May.

Local Name: 'Semal'

Siddiqui 31979, Shaheed Udhyan.

XXII. STERCULIACEAE

Key to Genera:

Herbs.

Leaves ovate-lanceolate; flowers pink or white, in compact terminal heads; staminodes none ..... 1. *Melochia*

Leaves linear-lanceolate; flowers red, axillary; staminodes 5, petaloid ..... 2. *Pentapetis*

Shrub or tree.

Lower surface of the leaves ashy-brown; flowers white, fragrant; fruit woody not twisted, a tree ..... 3. *Pterospermum*

Lower surface of the leaves not ashy-brown; flowers red, fruit twisted, a shrub ..... 4. *Helicteres*

1. **Melochia** Linn.

Melochia corchorifolia Linn. Sp. Pl. 675, 1753; FBI. 1:374, 1875; FUGP. 1:100, Repr. ed. 1960; HFDD. 94, 1977.

Riedleia corchorifolia DC., Wt. & Arn. Prodr. 66; D. & G. Bomb. Fl. 14.

Erect, unbranched annual. **Stem** glabrous, except 2 hairy lines along inter nodes. **Leaves** ovate-lanceolate, cordate or rounded, serrate incised. **Flowers** in subsessile, compact, terminal many flowered heads. **Sepals** 5, connate; calyx tube pilose. **Petals** pink

or white, 5, ovate. **Stamens** 5; filament partly connate, staminodes none. **Ovary** 5-celled, villous. **Style** 5 basally connate. **Capsule** globose, hispid. **Seeds** trigonal, striate, greyish-brown.

A very common plant, capable of growing in a variety of soils. Vegetatively it can be mistaken for *Malvastrum coromandelianum* but can be easily discerned with the help of 2 hairy lines running along the internode which are absent in the latter.

Flowering: August-November; **Fruiting:** October-December.

Siddiqui 31452, Chirouli.

Plants associated: *Crotalaria prostrata*,*Corchorus aestuans*, *Urena lobata*, *Croton bonplandianum*, *Nicotiana plumbaginifolia* etc.

2. **Pentapetis** Linn.

Pentapetis phoenicia Linn. Sp. Pl. 698, 1753; FBI. 1:371, 1875; FUGP. 1:99, Repr. ed. 1960.

An erect shrubby annual, stellate pubescent. **Leaves** long, linear, lanceolate, serrate, stellate hairy beneath, petiolate; stipules linear, subulate. **Flowers** axillary scarlet, solitary or paired. **Staminodes** 5, petaloid. **Capsule** globose, hairy.

Cultivated often in parks and gardens.

Ethnobotanical use:

Roots are given orally with water in case of snake bite.

Flowering : July-August; **Fruiting:** August-September.

Local Name: 'Gul-dopahrai'

Siddiqui 31954, Homoepathic Hospital.

3. Pterospermum Schreb.

Pterospermum acerifolium Willd. Sp. Pl. 3:729, 1800; Ind. Tr. 91, Repr. ed. 1971; FPP. 42, 1978.

A medium sized gracefull tree. **Branches** and inflorescence ferruginous. **Leaves** large petiolate, obovate to orbicular, abaxially ashy-white. **Flowers** large, fragrant, white turning to cream-yellow. **Sepals** linear-oblong, rusty floccose outside. **Petals** linear, revolute, white-creamy-yellow. **Stamens** 15, in 3 whorls. **Ovary** densely villous, 5-celled. **Capsule** hairy, brown, pentagonal. **Seeds** many, compressed with large brown membranous wings.

Planted in gardens and parks.

Flowering & Fruiting: January-July.

Siddiqui 31977, Shahhed Udhyan.

4. **Helicteres** Linn.

Helicteres isora Linn. Sp. Pl. 963, 1753; FBI. 365, 1875; FUGP. 1:96, Repr. ed. 1960; Ind, Tr. Repr. ed. 1971; FPP. 48, 1978.

Erect shrub, young parts stellate tomentose. **Leaves** distichous, oblong, suborbicular to obovate, acute, crenate, serrate to lobed, scabrous adaxially and pubescent abaxially, stipules deciduous. **Flowers** brick-red in axillary,sometimes extra-axillary fascicles, zygomorphic, 2-4 clustered. **Calyx** 2-lipped, gibbous, hairy. **Petals** 5, clothed, reflexed unequal. **Stamens** forming a column; stminodes 5, scale-like. **Fruit** cylindrical, twisted. **Seeds** tubercled.

Common in grass-lands and open forests, generally gregarious.

Ethnobotanical use:

Root bark is given in powder form in case of diabetes.

Flowering ; April-August; **Fruiting:** October-December.

Local Name: 'Murra'

Siddiqui 313Ø4, Atwa.

The following plants are often cultivated within the area.

1. **Pterigota alata** (Roxb.) R.Br. in Benn. Pl. Jav. Ar. 234, 1844.

Sterculia alata Roxb. Pl. Cor. 3:84. t. 287, 182Ø; FBI. 1:36Ø, 1875.

A large deciduous tree with buttressed trunk and oblong spreading crown. **Leaves** large broadly ovate, basal nerve with long petiole. **Flowers** in short rusty tomentose racemes. **Calyx** campanulate. **Follicles** stalked, woody, globose. **Seeds** oblong winged.

Flowering & Fruiting: February-May.

2. **Sterculia urens** Roxb. Cor. Pl. 1:25. t. 24, 182Ø; Ind. Tr. 81, Repr. ed. 1971.

A medium sized deciduous tree with greenish-grey bark, globular oblong crown. **Leaves** shallowly 5-lobed, crowded at the ends of the branch. **Gynophore** distinct. **Fruit** a follicle, coriaceous with stinging hairs.

Flowering: February-March; **Fruiting:** May.

XXIII. TILIACEAE

Key to Genera:

Fruit spinous; flowers in leaf-opposed or axillary panicles .....*1. Triumfetta*

Fruit not spinous; flowers in axillary clusters.

Fruits dry .....*2. Corchorus*

Fruits fleshy .....*3. Grewia*

1. **Triumfetta** Linn.

Triumfetta rhomboidea Jacq. Enum. Pl. Carib. 22, 1760; FBI. 1:395, 1875; FUGP. 1:111, Repr. ed. 1960; FPP. 46, 1978.

Triumfetta bartramia Linn. Syst. ed.10. 1044, 1759 (nom. illeg.).

A branched or unbranched herb, stillately pubescent. **Leaves** petiolate; petiole somewhat swollen near the leaf base; leaf polymorphous, pubescent on both the faces, 3-7 nerved, coarsely serrate, apex acute. **Flowers** yellow, in dense lateral or terminal cymes. **Sepals** 5, free, oblong, apical extension of the sepal is somewhat spur like structure. **Petals** 5, free, obovate. **Stamens** 8-15; filiform filaments; anthers 2-celled, dorsifixed, splitting lengthwise. **Ovary** globose and tubercled. **Fruit** spinous capsule.

Abundant within the area.

Flowering: August-September; **Fruiting:** November-December.

Siddiqui 31441, Kahoura.

2. **Corchorus** Linn.

Key to species:

Fruit subglobose .....1. *C. capsularis*

Fruit elongated.

Beak erect, entire; capsule not winged .....2. *C. olitorius*

Beak spreading; capsule winged.....3. *C. aestuans*

1. **Corchorus capsularis** Linn. Sp. Pl. 529, 1753; FBI. 1:397, 1875; FUGP. 1:113, Repr. ed. 1960; FPP. 43, 1978.

A large herb or undershrub. **Stem** sparingly branched. **Leaves** ovate, oblong, lanceolate, serrate, base sometimes with two auricles, acuminate. **Flowers** yellow, mostly solitary, sometimes fascicled. **Sepals** 5, cucullate, mucronate. **Petals** 5, yellow, longer than the sepals. **Stamens** many, shorter than the petals. **Ovary** 3-6 celled, pubescent. **Fruit** a globose, warty capsule, 5-valved. **Seeds** dark-brown to black.

Rare, occassionally found on the moist places.

Ethnobotanical uses:

The leaves are demolcent, bitter tonic, stomachic, laxative, carminative, anthelmintic, astringent. Dried leaves are taken with rice (*Oryza sativa*) in case of dysentery. Fruits are given in case of dirrhoea.

Flowering : September-October; **Fruiting:** November-Decemeber.

local Name: 'Joot' or 'Patwa'

Siddiqui 31487, Sadai behta.

2. **Corchorus olitorius** Linn. Sp. Pl. 529, 1753; FBI. 1:397, 1875; FUGP. 1:113, Repr. ed. 1960; FPP. 44, 1978.

A large much branched herb. **Leaves** ovate, lanceolate, serrate, rounded at the base with 2 setaceous, long appendages on either sides of the base. **Flowers** in 1-3 flowered axillary cymes. **Sepals** 5, cucullate apically. **Petals** 5, free, oblong, yellow. **Stamens** many, shorter than the petals. **Ovary** 3-6 celled, pubescent. **Fruit** a cylindrical, wingless, 5-valved capsule, 10-ribbed; valves transversely septate.

Common in sandy soil.

Flowering: October-November; **Fruiting:** December.

Siddiqui 31511, Atwa.

3. **Corchorus aestuans** Linn. Syst. ed. 10. 1079, 1759; Raizada Ind. For. Rec. 5(1):12, 1958; FPP. 43, 1978.

Corchorus acutangulus Lamk. Encycl. 2:104, 1786; FBI. 1:398, 1875; FUGP. 1:114, Repr. ed. 1960.

Erect annual herb, woody at the base, younger parts pubescent. **Leaves** ovate, oblong, acute, serrate, rounded at the base; stipules linear, subulate. **Flowers** 2-3 in axillary fascicles. **Sepals** 5, free, margins reddish-brown, cucullate at the apex. **Petals** longer than the sepals, yellow. **Fruit** 3-valved, cylindric capsule; valves winged, terminal beaks spreading, 2-fid.

This is the commonest species of *Corchorus* of this area, found on road sides, cultivated lands and waste places.

Flowering: August-October; **Fruiting:** September-December.

Siddiqui 31422, Bhulbhuliya.

3. **Grewia** Roxb.

Key to species:

Leaves broadly ovate;blade of petals
oblong and longer than the claw.

Fruits with a crustaceous rind.....1. *G. sclerophylla*

Fruits without crustaceous rind.....2. *G. asiatica*

Leaves oblong, lanceolate; blade of
petals shorter than the claw .....3. *G. laevigata*

1. **Grewia sclerophylla** Roxb. Hort. Beng. 42, 1814; FBI. 1:387, 1875; Brandis, For. Fl. 39, 1874.

Grewia scabrophylla Roxb. Fl. Ind. 2:584, 1832; FBI. 1:387, 1875; FUGP. 1:105, Repr. ed. 1960; Ind. Tr. 99, Repr. ed. 1971.

A dwarf shrub, young parts densely tomentose. **Leaves** ovate or obovate, serrate, acute-obtuse; base truncate or rounded, hoary abaxially, adaxial surface with very short stellate hairs and often reddish. **Flowers** in axillary umbellate, peduncled clusters; peduncles exceeding the petiole. **Sepals** longer than the petals, single nerve, cucullate at apex. **petals** blade longer than the claw; claw with a peripheral ring of silvery hairs. **Stamens** numerous. **Ovary** densely hairy.

Often found on the slopes of rosd sides ditches.

Ethnobotanical use:

Root, stem and leaf is given in leprosy.

Flowering: May-September; **Fruiting:** November-March.

Local Name: 'Dhaman'

Siddiqui 31356, Pokhar.

2. **Grewia asiatica** Linn. Mart. 1:122, 1767 FBI. 1:387, 1875; FUGP. 1:107, Repr. ed. 1960; FL. Delhi 87, 1963.

A medium sized tree. **Bark** greenish-white. **Leaves** ovate-orbicular, serrate, 5-7 nerved, petioled, stipule linear. **Flowers** in axillary peduncled, clusters of 2-4 or more, peduncle longer than the petiole. **Petals** 5; blade equal to or longer than the claw. **Fruit** fleshy, pulp acid or sweet, edible.

Cultivated in orchards for edible fruits.

Flowering: April-May; **Fruiting:** June-August.

Siddiqui 31315, Asgaon.

3. **Grewia leavigata** Vahl, Symb. Bot. 1:34; FBI. 1:389, 1875; Ind. Tr. 96, Repr. ed. 1971; FUGP. 1:109, Repr. ed. 1960.

Grewia disperma Rottl. ex Sprang. Syst. 2, 579.

Grewia didyma Roxb. Hort. Beng. (93) Fl. Ind. 2:591.

A small shrub. **Leaves** oblong-lanceolate, acuminate, serrate, membranous, petiolate, stipule subulate. **Flowers** yellow, 2-6 together on axillary peduncles. **Sepals** linear, oblong. **Petals** yellow, claw with a ring of white hairs; blade shorter than the claw, triangular. **Stamens** numerous. **Ovary** pubescent; style longer than the stamens. **Fruit** not seen.

Often found near the villages.

Flowering & Fruiting: June-January.

Siddiqui 31392, Bhura tikku.

XXIV. LINACEAE

Linum Linn.

Key to species:

Flowers red; sepals shorter than the capsule; stigmas capitate .....1. *L. grandiflorum*

Flowers blue; sepals longer than the capsule; stigmas clavate .....2. *L. usitatissimum*

1. **Linum grandiflorum** Desf. Fl. Atlant. 1:278. t. 78, 1798; Man. Cult. Pl. ed. 2. 604, 1949; HFDD. 98, 1977.

An erect annual herb. **Stem** corymbosely branched above. **Leaves** ovate-lanceolate, acute. **Flowers** red with dark centre, in leaf corymbs. **Sepals** ovate-lanceolate, acuminate, margins scarious hairy. **Stamens** 5, connate at base. **Styles** connate at base. **Capsule** globose, pointed.

Cultivated in lawns and gardens. Present a very picturesque sight when in full bloom.

Flowering: December-February; **Fruiting:** March-April.

Siddiqui 31998, D.M. Lodge.

2. **Linum usitatissimum** Linn. Sp. Pl. 227, 1753; FBI. 1:410, 1874; FUGP. 1:115, Repr. ed. 1960; Man. Cult. Pl. ed. 2. 604, 1949; HFDD. 99, 1977.

Annual erect herb, branched or unbranched. **Leaves** linear-lanceolate, 3-nerved, glabrous. **Flowers** blue in corymbose panicles. **Sepals** 5. **Petals** 5, blue, dentate-crenate. **Stamens** 5,

filaments connate at base; staminodes 5, tooth-like, alternating with perfect stamens. **Styles** 5, stigmas clavate. **Seeds** compressed ovate, shortly beaked, polished, dark-brown.

Cultivated as a commercial crop. The seeds yield an oil, locally called as 'Alsi ka tel'.

Ethnobotanical uses:

Leaves are used in gonorrhoea. The seeds are slightly diuretic and emollient, used in gonorrhoea, dysentery, cold, cough, sore chest, inflammatory gastro-intestinal disorders, irritation of the genito-urinary organs and pulmonary complaints.

Flowering : January-February; **Fruiting:** March-April.

Local Name: 'Alsi'

Siddiqui 31208, Khera.

XXV. ZYGOPHYLLACEAE

Tribulus Linn.

Tribulus terrestris Linn. Sp. Pl. 387, 1753; FBI. 1:423, 1874; FUGP. 1:119, Repr. ed. 1960; Engler, Pflanzenfam. ed. 2. 19a:176, 1931; HFDD. 100, 1977.

A prostrate or decumbent, annual, branched, hirsut herb. **Leaves** pinnate in subequal pairs, 5-8 foliate. **Leaflets** oblong-obovate, appressed-villous beneath. **Flowers** yellow, solitary, axillary, short pedicelled. **Sepals** 5, appressed, silky villous. **Petals** 5, obovate, cuniate. **Stamens** 10, 5 long, 5 short alternating each other. **Carpels** 5; ovary 5-12 celled, sessile, hirsut; style short. **Fruit** 5-angled, 5-6 cocci, each coccus with 2 long and 2 short spines.

Abundant on road sides and waste places. Prefers sandy soil.

Ethnobotanical uses:

Roots of the plant are used in gonorrhoea and dysuria. The fruit is antispasmodic, aphrodisiac and emmenagogue. Juice of the fresh root is used in pureperal diseases.

Flowering : June-October; **Fruiting:** September-November.

Local Name: 'Gokharu'

Siddiqui 31393, Bhura tikku.

XXVI. OXILIDACEAE

Key to Genera:

Small herbs with capsular fruits.

Plants with creeping stem or underground root stock; leaves digitate .....*1. Oxalis*

Plants erect without underground root stock; leaves pinnate .....*2. Biophytum*

Medium sized tree; fruits juicy with 5 sharp ridges .....*3. Averrhoa*

1. **Oxalis** Linn.

Key to species:

Plants without root stock; flowers yellow.....1. *O. corniculata*

Plants with bulbous root stock; flowers pink .....2. *O. corymbosa*

1. **Oxalis corniculata** Linn. Sp. Pl. 435, 1753; FBI. 1:436, 1875; FUGP. 1:130, Repr. ed. 1960; Calder, Rec. Bot. Surv. Ind. 6:131, 1919; Kunth, Pfreich. 95:146, 1930; Eiten, Taxon, 4:99-105, 1955.

A hairy creeping herb, rooting at the nodes. **Leaves** long petioled; leaflets three, digitate, cuneate, obcordate. **Flowers** yellow in umbellate cymes, long peduncles. **Sepals** 5, free, lanceolate-oblong. **Petals** oblanceolate-oblong, bright-yellow with green base. **Stamens** 10, alternately long and short. **Capsule** hairy, oblong apex glabrous. **Seeds** transversely ribbed.

A coomon weed growing in a variety of soils and situations.

Ethnobotanical uses:

Leaf juice is taken with common salt in case of dysentery. The fresh leaves are eaten as vegetable to create appetite and to add digestion. Leaves are also have some property of cooling, refrigerant, appetizing.

Flowering & Fruiting: November-Late April.

Local Name: 'Tipatia' or 'Khatti-meethi-buti'
Siddiqui 31576, Chak.

Plants associated: *Malvastrum coromandeliana*, *Evolvulus alsinoides*, *Indigofera* sp., *Cynodon dactylon*, *Medicago denticulata*, *Melilotus indicus* etc.

2. Oxalis corymbosa DC. Prodr. 1:696, 1824; Calder, Rec. Bot. Surv. Ind. 6:337, 1912; Merr. Sunyatsenia, 5:88, 1940; Backer & Bakh. f. Fl. Java, 1:246, 1963.

Oxalis martiana Zucc. Denkschr. Akad. Munch. 9:144, 1923-24; Monogr. Amer. Oxalis 37, 1825; Kunth, Pfreich. 95:250, 1930.

Differs from previously described species in having a bulbous root stock with few scales; comparatively larger leaflets; pink-purple flowers and petals with darker streakes.

Rare, always grows in moist places.

Flowering & Fruiting: January-April.
Siddiqui 31225, Etouli.

2. Biophytum DC.

Biophytum sensitivum (Linn.) DC. Prodr. 1:690, 1824; FBI. 1:436,

1875; FUGP. 1:131, Repr. ed. 1960; Kunth, Pfreich. 95:393, 1930; van Steenis, Bull. Bot. Gard. Btz. Ser. 3. 18:452, 1950.

Oxalis sensitiva Linn. Sp. Pl. 434, 1753.

Erect, simple, annual herb. **Stem** with appressed or erecto-patent hairs, unbranched. **Leaves** pinnate, confined to upper parts of the plant; leaflets 6-12 pairs, oblong-ovate, base oblique. **Flowers** in umbellate racemes, yellow, pedicelled. **Sepals** 5, free, pilose. **Petals** oblong-obovate, yellow, lilac striped. **Stamens** 10, free, 5 outer smaller. **Carpels** 5, connate; ovary 5-celled, sparsely pubescent. **Fruit** loculicidal capsule. **Seeds** minute, warty.

Rare, grows among the under growth in uncared mango orchards.

Flowering: September-October; **Fruiting:** November.

Siddiqui 31475, Raro.

3. Averrhoa Linn.

Averrhoa carambola Linn. Sp. Pl. 428, 1753; FBI. 1:439, 1875; FUGP. 1:124, Repr. ed. 1960; FPP. 50, 1978.

A medium sized tree, with a dome-shaped crown. **Leaves** impari-pinnate; leaflets 6-12, ovate-oblong. **Flowers** pink-purple in dense panicles cymes, usually in defoliate, often densely crowded. **Sepals** 5, free. **Petals** 5, free, contorted, oblong-ovate, longer than the sepals. **Stamens** 10, 1 reduced to staminodes. **Ovary** 5-ridged, hirsute, exhibits heterostyle. **Fruit** 5-ridged, berry. **Seeds** arillate.

Cultivated in gardens and road sides. Locally known as 'kamrakh'.

Flowering: September-October; **Fruiting:** December-January.

Siddiqui 31980, Bal Vidhya Mandir.

XXVII. TROPAEOLACEAE

Tropaeolum Linn.

Tropaeolum majus Linn. Sp. Pl. 345, 1753; Buchen. Pfreich. 10:1-36, 1902; Mant. Cult. Pl. ed. 2. 662, 1949; HFDD. 105, 1977.

Annual decumbent or straggling herb. **Leaves** peltate, orbicular, long petioled. **Flowers** axillary, long pedicelled, red, orange or lemon-yellow, variously blotched, zygomorphic with a long spur. **Sepals** five, posterior one produced into a spur. **Petals** five, distinctly clawed, 2 posterior smaller, 3 anterior larger. **Stamens** 8, unequal; filaments hairy at the base. **Ovary** 3-celled, 3-lobed, minutely ribbed; style shortly 3 branched. **Fruit** three seeded.

Cultivated as an ornamental plant in gardens during winter.

Flowering: January-February; **Fruiting:** April.

Siddiqui 3193, Chhatriya College.

XXVIII. BALSAMINACEAE

Impatiens Linn.

Impatiens balsamina Linn. Sp. Pl. 938, 1753; FBI. 1:453, 1874; Hook. f. Rec. Bot. Surv. Ind. 4:13. 19, 1913; HFDD. 105, 1977.

An erect annual herb. **Stem** fleshy, reddish, rooting from lower nodes. **Leaves** oblanceolate, short petioled, serrate, acute. **Flowers** solitary or in clusters of 2-3 axillary, zygomorphic. **Sepals** 3, posterior one petaloid and spurred. **Petals** 5, anterior one large, dorsally carinate, mucronate, lateral one paired, variously coloured, white, purple or red. **Stamens** 5; anthers connivent. **Ovary** 5-celled, superior, hairy; style none. **Stigma** 5. **Fruit** loculicidal capsule, splitting elastically. **Seeds** many, dark-brown to black.

Cultivated in gardens.

Flowering & Fruiting: September-December.

Siddiqui 31965, Tara Academy.

XXIX. RUTACEAE

Key to Genera:

Pericarp woody.

Leaflets 3; ovary 10-20 celled.....*1. Aegle*

Leaflets 5-7; ovary 5-6 celled.....*2. Feronia*

Pericarp not woody.

Armed shrubs or trees; leaflets 1;
fruit a hesperidium .....*3. Citrus*

Unarmed shrubs; leaflets 5 - 20;
fruit a berry .....*4. Murraya*

1. **Aegle** Correa, nom. cons.

Aegle marmelos (Linn.) Correa in Trans. Linn. Soc. Lond. 5:223, 1800; FBI. 1:516, 1875; FUGP. 1:134, Repr. ed. 1960; Parker For. Fl. 62; Fl. Delhi, 95, 1963; FPP. 51, 1978.

Crataeva marmelos Linn. Sp. Pl. 444, 1753.

An armed medium sized, deciduous tree with grey bark. Spines sharp, straight. Leaves 3 or rarely 5-foliate; leaflets ovate-lanceolate, shallowly crenate-dentate. Flowers in axillary or terminal penicles. Sepals 4-5, small, hairy. Petals greenish-white, elliptic-oblong, gland dotted. Stamens 40-60 around a small disc. Sometimes in 2-3 groups; anthers linear. Ovary 10-20 celled, ovules many in each cell; style short; stigma capitate. Fruit globose, rind woody, greenish-grey or ashy-grey. Seeds many embeded in orange coloured pulp, testa mucilaginous and hairy.

Commonly found throughout scrub-jungles. Often cultivated in gardens as for its fruits.

Ethnobotanical uses:

Juice of the bark is given with a little cumin *(Cuminum cyminum)* **in milk as a remedy for poverty of the seminal fluid. Fresh leaves juice given with honey as a mild laxative in fever and asthma; mixed with** *Solanum nigrum* **is used in constipation and jaundice. The unripe or half ripe fruit is astringent, stomachic and digestive. It is best given in subacute or chronic cases of diarrhoea, dysentery and irritation of the alimentary canal. A sharbat of the ripe fruit is given for chronic constipation and dyspepsia.**

Flowering: April-May; **Fruiting:** March-June.

Local Name: 'Bel'

Fruit ripens in hot season a year after flowering.
Siddiqui 31994, Collectrate.

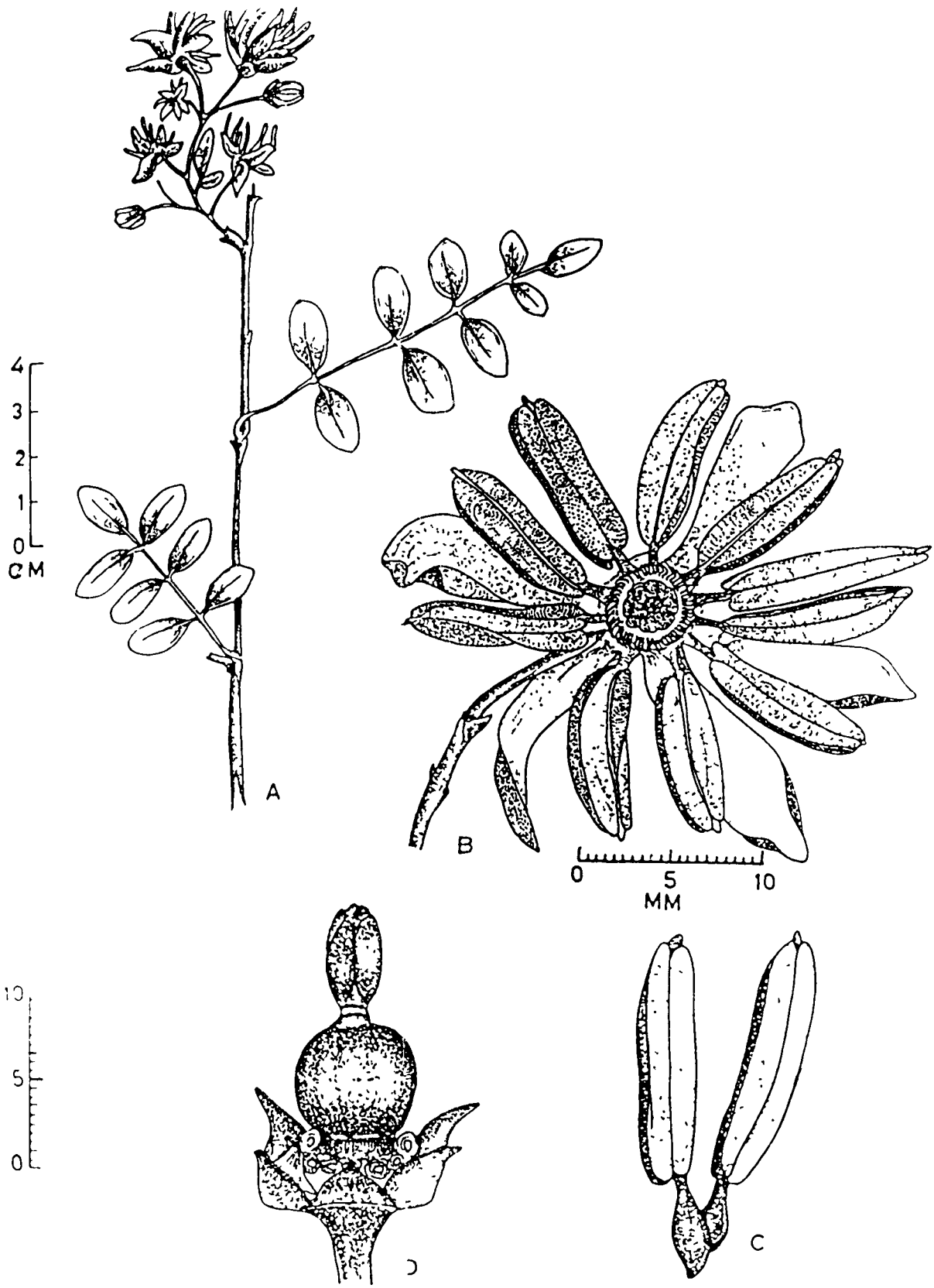
2. **Feronia** Correa

Feronia limonia (Linn.) Swingle in Journ. Wash. Acad. Sci. 4:328, 1914; Webber & Batchelor, Citrus Ind. 1:466, 1948; Fl. Delhi 96, 1963; FPP. 53, 1978.

Schinus limonia Linn. Sp. Pl. 389, 1753.

Feronia elephantum Correa in Trans. Linn. Soc. Lond. 5:225, 1800; FBI. 1:516, 1875; FUGP. 1:134, Repr. ed. 1960.

A deciduous medium sized, armed tree. **Branches** pendant. **Bark** ashy-grey. **Leaflets** 5-7, subsessile, cuneate, apex usually



Feronia limonia (Linn.) Swingle

emarginate, subcoriaceous, rachis slightly winged. **Flowers** in pubescent panicles, shorter than the leaves; male and female flowers usually on the same panicle. **Sepals** 5-6, free, imbricate. **Petals** 5-6, free, pale-green, tinged with dull-red. **Stamens** 10-12; filaments short and villous; anthers linear oblong, brown. **Ovary** 5-6 celled, ovules many on 5-6 parietal placentae (the ovary becomes 1-celled when matures); style none, stigma fusiform. **Fruit** globose berry with woody pericarp, rough. **Seeds** oblong, embeded in edible pulp.

Often cultivated in gardens and road sides.

Ethnobotanical uses:

Juice of the leaves is given with milk and sugar in biliousness and bowel complaints of the children. The unripe fruit is used in diarrhoea and dysentery. The ripe fruit is refreshing, aromatic, astringent, carminative, digestive and tonic.

Flowering: April-June; **Fruiting:** November-January.

Local Name: 'Kaitha'

Siddiqui 31930, Lucknow Road.

3. **Citrus** Linn.

The following species of *Citrus* are cultivated.

1. **Citrus maxima** (Burm.) Merr. Interpret. Herb. Amb. 296, 1917 & Sp. Blancoanae. 204; Fl. Delhi, 94, 1963.

Aurantium maximum Burm. Auct. Herb. Amb. 16, 1755.

Citrus grandis Osbeck, Dagbok Ostind. Res. 98, 1757.

Citrus decumana Linn. Syst. 508, 1774; FBI. 1:516, 1875; FUGP.

1:133, Repr. ed. 1960.

Fruit large, pale-globose or pyriform, rind thick; pulp pinkish, sweet.

Cultivated in orchards for the sake of fruits locally known as 'Chakotra'.

Siddiqui 31908, S.P. Lodge.

2. **Citrus limon** (Linn.) Burm. f. Fl. Ind. 173, 1768; Webber & Batchelor, Citrus Ind. 1:398, 1948.

Citrus medica var. *limon* Linn. Sp. Pl. 2:782, 1753.

Fruit oblong to ovoid, lemon yellow, mamillate at apex.

Flowering: April-May; **Fruiting:** November-December.

Local Name: 'Galgal'

Siddiqui 31917, Door Darshan Kendra.

3. **Citrus medica** Linn. Sp. Pl. 782, 1753; FBI. 1:514, 1875; FUGP. 1:131, Repr. ed. 1960; Fl. Delhi, 95, 1963; FPP. 53, 1978.

Fruit large, oval-oblong, mamillate, verrucose rind, yellow when ripe.

Flowering & Fruiting: July-December.

Local Name: 'Nibua'

Siddiqui 31992, Inspection House.

4. **Citrus aurantifolia** Christl. in Linn. Pflanzenfam. Syst. 1:618, 1777.

Fruit globose to ovoid-oblong, yellow when ripe; rind then.

Cultivated one of the most important species of *Citrus* from

commercial point of view.

Flowering: February-March; **Fruiting:** November-December.

Local Name: 'Kagzi-Nebu'

Siddiqui 31961, Homeopathic Hospital.

4. **Murraya** Linn. Corr. Murr., nom. cons.

Key to species:

Leaflets upto 23 with a pungent smell, mature berries black .....1. *M. koenigii*

Leaflets not more than 9, without pungent smell, berries orange-red .....2. *M. paniculata*

1. **Murraya koenigii** (Linn.) Sprenge. Syst. 2:315, 1825; FBI. 1:503, 1875; FUGP. 1:129, Repr. ed. 1960; Fl. Delhi, 97, 1963.

Bergera koenigii Linn. Mant. 563, 1771.

A foetid deciduous shrub with thin dark-brown bark; young parts downy. **Leaves** with 19-23 oblique leaflest; margins crenate, apex acute, rachis puberulous. **Flowers** white, axillary or terminal corymbose panicles. **Sepals** small acute. **Petals** oblong, obtuse, glandular. **Ovary** 2-celled; style short cylindrical. **Fruit** ovoid, rugose berry, black when ripe.

Commonly found in wild states.

Ethnobotanical uses:

Tender leaves are eaten in diarrhoea and dysentery. Decoction of leaves is given in fever. A poultice of the leaves is applied over eruptions.

Flowering: February-May; **Fruiting:** Cold season.

Local Name: 'Nim-kathia'

Siddiqui 3120Ø8, Khera.

2. **Murraya paniculata** (Linn.) Jacq. in Mal. Misc. 1(5):31, 182Ø; Santapau in Rec. Bot. Surv. Ind. 16(1):39, 1953.

Chalcas paniculata Linn. Mant. 68, 1767.

Murraya exotica Linn. Mant. 563, 1771 (Murraea); FBI. 1:5Ø2, 1875; FUGP. 1:128, Repr. ed. 196Ø.

Evergreen shrub or tree. **Branches** not lenticellate. **Leaflets** 7-9, slightly coriaceous. **Flowers** white, fragrant, solitary or terminal or axillary corymbose. **Sepals** 5 or 6, minute, obtuse, glandular. **Petals** 5, free, oblong, lanceolate. **Stamens** 1Ø, obdiplostamonous, basally dilated. **Fruit** berry, orange-red when ripe.

Cultivated as hedge.

Flowering: March-September; **Fruiting:** October-February.

Local Name: 'Kamini'

Siddiqui 31918, Door Darshan Kendra.

XXX. SIMAROUBACEAE

Ailanthus Desf., nom. cons.

Ailanthus excelsa Roxb. Pl. Cor. 1. f. 23, 1795; FBI. 1:518, 1875; FUGP. 1:136, Repr. ed. 1960; Nooteboon in Fl. Males. 6(2):219, 1962; FPP. 54, 1978.

A large deciduous tree; young parts rusty villous. **Wood** soft white. **Leaves** unequal pinnate, crowded near the ends of the branches, with a disagreeable odour; branches with papaya like prominent leaf scars; leaflets 8-15 pairs, ovate lanceolate, coarsely toothed, pilose when young. **Flowers** small, yellowish in long terminal or axillary panicles, polygamous. **Sepals** 5, hairy. **Petals** 5, longer than the sepals, oblong lanceolate. **Stamens** 10 in male and 2-3 in bisexual flowers, inserted on 10-lobed interstaminal disk. **Ovary** 2-5 partite; style connate. **Stigma** peltate. **Fruit** samara, spingle shaped, twisted at base.

Planted on road sides.

Ethnobotanical uses:

The bark is given in dysentery, bloody stools, dyspepsia, bronchitis, asthma. The juice of the leaves or of the fresh bark is given with Ghur to check after-pains.

Flowering: January-March; **Fruiting:** May-June.

Leaf fall: May-June.

Siddiqui 31919, Door Darshan Kendra.

XXXI. BALANITACEAE

Balanites Delile

Balanites aegyptiaca Linn. Delile, Fl. Aegypt. 221, t. 28, f. 1, 1813.

Balanites roxburghii Planch. in Ann. Sc. Nat. (Ser. 4) 4:258; 1854; FBI. 1:522, 1875; FUGP. 1:136, Repr. ed. 1960; Fl. Delhi, 97, 1963.

A scraggy, spinous shrub or a small tree. Young branches tomentose, spines straight and sharp. **Leaves** palmate, 2-foliate, leaflets obovate or elliptic, puberulous, entire, coriaceous. **Flowers** fascicled in axillary cymes, fragrant, bisexual, 5-merous. **Sepals** 5, free, tomentose outside, silky within. **Petals** 5, free oblong, villous, spreading. **Stamens** 10, free, inserted on thick furrowed disk; filaments filiform; anthers 2-celled. **Carpels** 5, ovary 5-celled, villous, half seated in the disk; style short conical. **Fruits** 1-seeded, drupe, 5-grooved, yellowish-green, rind woody; pulp offensive smelling.

Common on sandy soils.

Ethnobotanical uses:

Dried leaves are applied to blood eruptions. Roots and fruits is purgative and anthelmintic.

Flowering: April-May; **Fruiting:** October-November.

Local Name: 'Hingan'

Siddiqui 31305, Atwa.

XXXII. MELIACEAE

Key to Genera:

Seeds winged; filament distinct.....*1. Toona*

Seeds wingless; filament connate into staminal tube:

Leaves one - pinnate; flowers creamy-white .....*2. Azadirachta*

Leaves two - pinnate; flowers lilac-purple .....*3. Melia*

1. Toona Roem

Toona ciliata Roem. Syn. Hesp. 139, 1846; Harms in Pfam. 3(4):278, t. 151 D & (ed. 2) 1961; 45 & 42, t. 2D; Santapau in Rec. Bot. Surv. Ind. 15(1) 38, 1967.

Cedrela toona Roxb. ex Rottl. & Willd. in Ges. Not Fr. Neue Schr. 2:198, 1803; FBI. 1:568, 1875; FUGP. 1:143, Repr. ed. 1960.

A large handsome deciduous tree. **Bark** grey, exfoliating flakes and exposing red coloured. **Leaves** glabrous paripinnate, 30-60 cm long. **Leaflets** 4-12 pairs, ovate-lanceolate, acuminate, slightly falcate, entire or undulate subcoriaceous, oblique base. **Flowers** 5-merous, white, fragrant, in drooping panicles. **Sepals** ciliate, obtuse, slightly connate at the base. **Petals** oblong, obtuse ciliate. **Stamens** 5, free inserted on the hairy, 5-lobed orange disk. **Ovary** 5-celled, hairy, style short; stigma paltate. **Capsule** septi-fragally dehiscent, oblong, smooth, dark-brown. **Seeds** reddish brown, winged on both ends.

Planted in the avenues.

Ethnobotanical use:

The flowers are considered to be emmenagogue.

Flowering: With new leaves March-April; **Fruiting:** June-July.

Local Name: 'Tun'

Siddiqui 31920, Chhatriya College.

2. **Azadirachta** Juss.

Azadirachta indica A. Juss. in Mem. Mus. Par. 19:221, 1830; Fl. Delhi 99, 1963; FPP. 56, 1978.

Melia azadirachta Linn. Sp. Pl. 385, 1753; FBI. 1:544, 1875; FUGP. 1:141, Repr. ed. 1960.

Melia indica (A-Juss) Brandis, For. Fl. N. W. & C. India 67, 1874.

Antelaea azadirachta (Linn.) Adebb. Blumea 6:315, 1948.

A large deciduous tree with globular crown and dense canopy. **Leaves** imparipinnate, crowded towards the ends of branches; leaflets 9-13, falcate-lanceolate, glabrous, sharply serrate, oblique at the base. **Flowers** creamy-white, honey scented, 5-merous. **Sepals** 5, free or slightly connate at the base, oblong. **Petals** creamy-white, oblong-spathulate, ciliated, spreading. **Stamens** 10, filament connate to form a tube; tube hairy inside. **Ovary** 3-celled; ovules in each cell. **Fruit** ovoid or oblong drupe, 1-seeded, yellow and smooth when ripe.

Extensively planted in gardens, near villages and in houses for shade.

Ethnobotanical uses:

All the parts of the tree are much valued for their medicinal properties in case of carminative, expectorant, anthelmintic, antidotal, diuretic, emmenagogue, jaundice, skin diseases, anti-septic, eruption of small pox glandular swelling and wounds etc.

Flowering: March-May; Fruiting: May-July.

Local Name: 'Neem'

Siddiqui 31913, Sitapur Road.

3. **Melia** Linn.

Melia azedarach Linn. Sp. Pl. 384, 1753; FBI. 1:544, 1875; FUGP. 1:141, Repr. ed. 1960; Parker For. Pl. 72; Merr. Enum. 2:360; Fl. Delhi 99, 1963; FPP. 56, 1978.

A medium sized, deciduous tree with a globose to spreading crown. **Leaves** bipinnate, leaflets 9-15, ovate-elliptic, crenate-serrate, oblique at the base. **Flowers** in axillary panicles, nearly equalling the leaves, lilac-blue in colour, fragrant. **Sepals** 5, ovate, oblong. **Petals** oblong-oblanceolate shorter than sepals. **Stamens** 10, forming a purple tube; tube hairy inside. **Ovary** 5-celled, ovules 2 in each cell. **Fruit** ellipsoid or globose drupe; yellowish-brown and wrinkled when ripe. **Seeds** 5 or fewer.

Planted in parks, gardens and on road sides.

Ethnobotanical uses:

The leaves are diuretic, antilithic and emmenagogue. The bark of the stem is anthelmintic, stimulant and antispasmodic. Flower

paste is used in skin diseases. The dried fruit are taken in case of tapeworm, round-worm and other intestinal worms.

Flowering: March-April; **Fruiting:** November-December.

Local Name: 'Bakain'

Siddiqui 31926, Collectrate.

XXXIII. CELASTRACEAE

Key to Genera:

Fruit dehiscent; stamens 5, inserted on the edge of the concave disk .....*1. Celastrus*

Fruit indehiscent; stamens 5, inserted on the edge of the fleshy disk .....*2. Elaeodendron*

1. Celastrus Linn.

Celastrus paniculata Willd. Sp. Pl. 1:1125, 1797; FBI. 1:616, 1875; Ind. Tr. 162, Repr. ed. 1971; FUGP. 1:148, Repr. ed. 1960; FPP. 57, 1978.

A large unarmed shrub with drooping green branches, covered with longitudinal lenticels. **Leaves** alternate, exstipulate, petiolate, obovate, serrate, acuminate; base cuneate; lateral nerves 5-6 pairs, glabrous lower surface finely gland dotted. **Infloresscence** a thyrse. **Flowers** minute, whitish-green, pedice- lled; pedicel slightly hairy. **Bracts** smaller than the pedicels. **Calyx** 5-lobed, imbricate, rounded with fimbriate margins, thick glabrous. **Petals** greenish, oblong, glabrous, somewhat thick, recurved after anthesis. **Stamens** 5, adnate to the margins of cupular hypogynous disk; filaments very short, anthers creamy-white, shorter than petals. **Style** short, stigma notched. **Capsule** globose, bright yellow when ripe, 3-valved, 3-6 seeded. **Seeds** black, in red arillus.

Commonly found throughout the area.

Ethnobotanical uses:

Seeds are used to stimulate the intellectual power and sharpening the memory and also in rheumatism, gout, paralysis, leprosy and scabies.

Flowering: and new leaves; April-June; **Fruiting:** October-January.

Local Name: 'Kankun'

Siddiqui 31316, Asgaon.

2. Elaeodendron Jacq.

Elaeodendron glaucum Pers. Syn. 1:241, 1805; Roxb. Fl. Ind. 1:638, 1832; FBI. 1:623, 1875; FUGP. 1:150, Repr. ed. 1960; Ind. Tr. 164, Repr. ed. 1971.

A large deciduous tree, often with reddish or purplish branchlets. **Leaves** usually opposite, 5-15 cm long, elliptic, crenate, glabrous, coriaceous, stipules minute, caducous. **Flowers** greenish-white, in axillary dichotomous lax cymes; bracts small caducous. **Calyx** 4-5 partite, obtuse. **Petals** 4-5 oblong. **Stamens** 4-5, inserted under the edge fleshy disk; anthers globose; filament recurved. **Ovary** sunk in the disk, base adnate, 2-5 celled, style short and thick. **Fruits** obovoid drupe, 1-celled, 1-seeded, tipped with persistent style, yellowish-green, endocarp crustaceous.

Frequently common throughout the area.

Ethnobotanical uses:

Leaves are used in hysteria and to relieve headache.

Flowering & Fruiting: February-August.

Local Name: 'Chauri'

Siddiqui 31252, Jhala.

XXXIV. RHAMNACEAE

Zizyphus Linn.

Key to species:

Drupe fleshy, stone one-two celled. Cymes axillary; nearly sessile; petals five.

- Erect trees or shrubs; drupe orange or red when ripe.
  - Leaves 2-5 cm long, glabrous above .....1. *Z. mauritiana*
  - Leaves 1-2 cm long, pubescent above .....2. *Z. nummularia*
- Scandent shrubs; leaves with much oblique base; fruits black when ripe.....3. *Z. oenoplia*

Drupe nearly dry, stones 3-celled. Cymes simple, axillary on short peduncles; petals 4-5 .....4. *Z. xylopyrus*

1. **Zizyphus mauritiana** Lamk. Encycl. 3:319, 1789; Santapau in Journ. Bomb. Nat. Hist. Soc. 51:802, 1953; Santapau in Rec. Bot. Surv. Ind. 16(1):43, 1967; FPP. 59, 1978.

Zizyphus jujuba Lamk. Loc. Cit. (non Mill. 1768); FBI. 1:632, 1875; FUGP. 1:152, Repr. ed. 1960; Ind. Tr. 169, Repr. ed. 1971.

A medium sized tree, branches spreading and drooping. **Bark** dark-grey to black; young parts rusty tomentose. **Leaves** ovate-oblong, glabrous above, white tomentose beneath. **Prickles** paired, one

longer and straight, other shorter and curved. **Flowers** in axillary cymes, disk 10-lobed. **Sepals** 5, yellowish-green. **Petals** 5, free, spathulate, clawed. **Stamens** 5, antipetalous, smaller than petals. **Ovary** 2-celled. **Drupe** fleshy, globose, red when ripe. **Seeds** tubercled stony.

A common tree throughout the area, often cultivated.

Ethnobotanical uses:

Leaves are used in gonorrhoea, conjuctivitis, boils, carbuncles and in dysuria. Bark is given diarrhoea, dysentery, colic and inflammation of gums. Ripe fruit is a mild laxative and expectorant.

Flowering : May-September; **Fruiting:** December-February.

Local Name: 'Ber'

Siddiqui 31350, Chandra Devi Shiksha Niketan.

2. **Zizyphus nummularia** (Burm. f.) Wt. & Arn. Prodr. 162, 1834; FBI. 1:633, 1875; Ind. Tr. 170, Repr. ed. 1971; FPP. 59, 1978.

Rhamnus nummularia Burm. f. Fl. Ind. 61, 1768.

Zizyphus rotundifolia Lamk. Encycl. 3:319, 1789; FUGP. 1:153, Repr. ed. 1960.

Straggling shrub, branches flexous, divaricate at right angles. Young twigs rusty or grey tomentose. **Leaves** ovate to orbicular, serrulate, pubescent above, grey tomentose beneath; stipular prickles two, one long straight and other short and curved. **Flowers** greenish in short compact axillary cymes. **Sepals** 5, pubescent. **Petals** obovate with inflexed margins. **Stamens** 5,

antipetalous. **Ovary** 2-celled. **Drupe** globose.

Common on dry and sandy soils.

Flowering: August-October; **Fruiting:** Decemebr-February.

Siddiqui 31463, Shahjahanpur Road.

3. **Zizyphus oenoplia** (Linn.) Mill. Gard. Dist. ed. 8, n. 3, 1768; FBI. 1:634, 1875; FUGP. 1:154, Repr. ed. 1960; Ind. Tr. 170, Repr. ed. 1971; FPP. 60, 1978.

Rhamnus oenoplia Linn. Sp. Pl. 194, 1753.

A scandent, thorny shrub, young parts often rusty; thorns slightly curved. **Leaves** obliquely ovate, oblanceolate, acute, 4-nerved at the base, rusty beneath. **Flowers** in short axillary cymes. **Sepals** 5. **Petals** 5. **Stamens** 5. **Style** 2-fid. **Fruit** a drupe, globose, black and shining.

Common on road sides and waste lands.

Flowering: March-May; **Fruiting:** Cold season.

Siddiqui 31285, Atwa.

4. **Zizyphus xylopyrus** Willd. Sp. Pl. 1:1104; FBI. 1:534, 1875; FUGP. 1:154, Repr. ed. 1960.

A large straggling deciduous shrub or a small tree, young parts tomentose. **Leaves** 3-5 nerved, broadly obovate, serrulate, tip rounded or acute, glabrous above, brown pubescent beneath; prickle usually two, one straight and other recurved. **Flowers** in dense axillary cymes, peduncled. **Calyx** lobes keeled at the apex. **Petals** reflexed, disk thin 5-angled. **Ovary** 3-celled. **Style** 3, nearly free upto base. **Drupe** globose, rind dry when ripe,

3-celled, 3-seeded.

Commonly found throughout the area.

Flowering: April-June; **Fruiting:** Cold season.

Siddiqui 3130ø6, Atwa.

XXXV. VITACEAE

Key to Genera:

Stem terete, not fleshy.

Leaves simple .....1. *Vitis*

Leaves pinnately compound .....2. *Cayratia*

Stem sharply quandrangular, fleshy, jointed .....3. *Cissus*

1. **Vitis** Linn.

Vitis vinifera Linn. Sp. Pl. 202, 1753; FBI. 1:652, 1875; FUGP. 1:160, Repr. ed. 1960; FPP. 60, 1978.

Deciduous climbing shrub. **Bark** thin, dark-brown, exfoliating in long narrow strips. **Leaves** petioled, simple, shallowly 3-5 lobed, serrulate, acid. **Flowers** in leaf-opposed cymes, unisexual or bisexual. **Sepals** 5, connate. **Petals** 5, connate apically, equalling or exceeding the calyx, greenish-white. **Stamens** anti-petalous. **Ovary** adnate to 5-lobed desk. **Fruit** globose or pyriform thin skinned berry, 2-4 seeded or seedless.

Cultivated in homes and orchards.

Ethnobotanical uses:

Leaves are used with black pepper in case of cold and cough.

Flowering : January-February; **Fruiting:** March-May.

Local Name: 'Angoor'

Siddiqui 31904, District Board Office.

2. **Cayratia** Juss., nom. cons.

Cayratia trifolia (Linn.) Domin, Biblioth. Bot. 89:371, 1927; Suesseng. Pflanzenfam. ed. 2. 20d: 280, 1953; HFDD. 107, 1977; FPP. 60, 1978.

Vitis trifolia Linn. Sp. Pl. 203, 1753; FUGP. 1:163, Repr. ed. 1960.

Cissus carnosa Lamk. Encycl. 1:31, 1783.

Cayratia carnosa (Lamk.) Gagnep. Not. Syst. 1:347, 1911.

Vitis carnosa (Lamk.) Wall. ex Laws. FBI. 1:654, 1875.

A large tendril climber on woody root stock. **Stem** older parts brown, sulcate, younger parts green with short spreading hairs. **Tendrils** leaf opposed, 4-5 branched, nearly equalling the leaf in the length; tips with adhessive discs. **Leaves** alternate, trifoliate; terminal larger, longer petioles, sometimes with very unequal halves; margins dentate, apex acute, base cuneate; lateral nerves 4-6 pairs. **Flowers** in axillary, branched cymes, greenish-white, shortly pedicelled. **Sepals** 4. **Petals** 4. **Stamens** 4, antipetalous; filaments dilated at the base. **Fruit** depressed, globose berry resembling a black pepper when dry, deep violet in colour. **Seeds** roughly trigonous, convex at the back with a median longitudinal ridge and 4-6 transverse ridges on either sides of the median ridges.

Occassionally met with climbing on other trees.

Flowering: May-June; **Fruiting:** October-November.

Siddiqui 31357, Pokher.

3. **Cissus** Linn.

Cissus quadrangula Linn. Mant. 39, 1767.

Cissus quandrangularis Wall. ex Wt. Arn. Prodr. 51, 1834; FBI. 1:645, 1875.

A small tendril climber. **Stem** jointed, fleshy, sharply 4-angled to 4-winged, constricted at the nodes and sometimes tinged with purple. **Leaves** simple, alternate, reniform, cordate, serrulate-dentate, obtuse, petioled; leaves remains on the stem for a short duration, then fall off never seen in flowering, propogated vegetatively.

Cultivated in rockeries.

Siddiqui 3198Ø, Shaheed Udhyan.

XXXVI. SAPINDACEAE

Key to Genera:

Shrubs or trees.

Trees with pinnate leaves and wingless fruits.

Fruits rind with conical tubercles; pulp white, edible, seeds brown ..... 1. *Nephelium*

Fruit rind not tubercled, pulp inedible.

Petals 4-5; fruit rind saponaceous ..... 2. *Sapindus*

Petals Ø; fruit rind not saponaceous ..... 3. *Schleichera*

Shrub with simple leaves and winged fruits ..... 4. *Dodonea*

Climber with ternate leaves & balloon like fruits ..... 5. *Cardiospermum*

1. **Nephelium** Linn. = Litchi Sonner

Nephelium litchi Cambess. in Mem. Mus. Par. 18:20, 1829.

Nephelium dimocarpus Hook. f. & Thoms. ex Hook. f. FBI. 1:688, 1875.

Litchi chinensis Sonner Voy. Ind. 3:225, 1789.

Litchi sinensis J. F. Gmel. Syst. 635.

A medium sized to large tree. **Leaves** pinnate; leaflets 2-4 (-6) pairs, coriaceous, shining above, glaucous below, elliptic-oblong to lanceolate, sharply acute, margins sometimes undulate. **Flowers** minute. **Calyx** cup-shaped, obscurely toothed. **Petals** none. **Fruit** oblong; rind with conical tubercles, bright red when ripe; pulp white, transluscent. **Seeds** dark-brown with a prominent arial.

Occassionally cultivated in orchards.

Flowering & Fruiting: February-June.

Siddiqui 31922, Shaheed Udhyan.

2. Sapindus Linn.

Sapindus emarginatus Vahl, Symb. 3:54, 1794.

Sapindus trifoliatus Hiern. in FBI. 1:682, 1875, pro parte (*non* Linn.); FUGP. 1:168, Repr. ed. 1960.

A medium sized evergreen tree. **Crown** globular, spreading, younger parts and inflorescence tomentose. **Leaves** peripinnate, alternate, exstipulate; leaflets 4-6, oval-oblong, apex emarginate or rounded, sometimes acute, glabrous, pubescent beneath, coriaceous. **Flowers** in terminal, pubescent panicles, white hairy, shortly pedicelled. **Sepals** 5, free, unequal, obtuse. **Petals** 5, spathulate hairy. **Stamens** 8; filaments hairy, anthers apiculate, empty in female flowers. **Ovary** 3-lobed, rusty tomentose. **Style** hairy at the base; stigma 3-lobed. **Fruit** fleshy schizocarp, globose, mericarps divaricate at maturity; 1-seeded, pericarp saponaceous. **Seeds** globular, black.

A handsome tree, often found under cultivation.

Ethnobotanical uses:

Fruits are the most medicinally useful; it is astringent, anthelmintic, tonic, emetic. It is also used in asthma, indigestion, diarrhoea, cholera, hysteria and scorpion bites.

Flowering: October-January; **Fruiting:** February-April.

Local Name: 'Reetha'

Siddiqui 31993, Hardoi.

3. Schleichera Willd., nom. cons.

Schleichera oleosa (Lour.) Oken. Allg. Naturgesch. (3). 2:1341, 1941; Santapau in Rec. Bot. Surv. Ind. 16(1):48, 1967.

Pistacia oleosa Lour. Fl. Coch. 2:615, 1790.

Schleichera trijuga Willd. Sp. Pl. 4(2):1096, 1805; FBI. 1:681, 1875; FUGP. 1:167, Repr. ed. 1960.

A medium sized tree with grey bark. **Leaves** peripinnate; leaflets 4-8, size decreases from terminus to base, oval-oblong, apex emarginate, glabrous above, pubescent beneath; younger leaves beautifull red. **Flowers** polygamous, in drooping racemes, yellowish, white, some trees with male flowers only. **Sepals** 4-6 valvate. **Petals** Ø. **Disk** annular, wavy. **Stamens** 5-8, longer than calyx and inserted within the disc; filaments pilose. **Fruit** smooth, indehiscent, pointed, 1-seeded, crustaceous. **Seeds** with fleshy aril.

Cultivated on road sides or as an avenue tree.

Ethnobotanical uses:

Bark is astringent, rub with oil to cure itches and acne.

Flowering: March-April; **Fruiting:** July-August.

Local Name: 'Kosimb' or 'Kusum'

Siddiqui 31931, Chhatriya College.

4. Dodonea

Dodonea viscosa (Linn.) Jacq. Enum. Pl. Cor. 19, 1760; FBI. 1:697, 1875; FUGP. 1:170, Repr. ed. 1960; FL. Delhi 103, 1863; FPP. 61, 1978.

Ptelea viscosa Linn. Sp. Pl. 1180, 1753.

A large evergreen shrub, with thin bark. **Leaves** simple, narrowly, obovate, entire, gland-dotted, apex obtuse; with a characteristic smell. **Flowers** in short axillary or terminal cymes, polygamous or polygamous-dioecious. **Sepals** 3-5, viscid, hairy. **Petals** 0. **Stamens** 8-10; filaments short. **Disk** inconspicuous. **Fruit** a compressed capsule with 2-3 longitudinal wings.

Very popular as a hedge plant.

Ethnobotanical uses:

Leaves are esteemed as sudorific in gout and rheumatism.

Flowering & Fruiting: November-April.

Local Name: 'Vilayati-mehdi'

Siddiqui 31539, Bal Vidhya Mandir.

5. Cardiospermum Linn.

Cardiospermum halicacabum Linn. Sp. Pl. 338, 1753; FBI. 1:670,

1875; FUGP. 1:166, Repr. ed. 1960; FPP. 61, 1978.

An annual tendril climber. **Stem** strongly striate green. **Leaves** biternate; leaflets elongate-ovate, serrate or coarsely dentate, mucronate, membranous, decurrent. **Flowers** in corymbose cymes provided with two opposite circinate tendrils, zygomorphic, polygamous, yellowish-white. **Sepals** 4, outer 2 smaller and inner 2 larger. **Petals** 4, unequal, obovate with basal scales. **Stamens** 8, disk of two glands. **Fruit** a membranous, loculicidal, inflatted green capsule, winged at angles. **Seeds** 3, globular, black with a large. white cordate chalaza at the base.

Common among the hedges.

Ethnobotanical uses:

Plant juice is used as an emmenagogue in amenorrhoea and gonorrhoea. Leaves are given sfin eruptions, pulmonary complaints diarrhoea and dysentery. Seeds are a tonic in fever and a diaphoretic in rheumatism.

Flowering & Fruiting: August-November.

Local Name: 'Kali-ghunghchi'

Siddiqui 31523, Saktapur.

XXXVII. ANACARDIACEAE

Mangifera Linn.

Mangifera indica Linn. Sp. Pl. 200, 1753; FBI. 2:13, 1875; FUGP. 1:176, Repr. ed. 1960; FPP. 62, 1978.

A small to large tree (depending on the variety), crown globose, dense. **Bark** dark-grey, rough. **Leaves** alternate, crowded at the ends of branches, oblong, lanceolate, margins wavy, young foliage, red-brown, flacid. **Flowers** in large terminal panicles, small, yellowish, polygamous. **Sepals** 4-6, hairy, free, ovate-oblong. **Petals** 4-5, ovate-oblong, lanceolate. **Stamens** 4-5, usually only one perfect. **Disk** 5-lobed. **Ovary** 1-celled. Fruit a drupe. Size, colour and flavour varies variety to variety.

The most extensively cultivated fruit tree of the area.

Ethnobotanical uses:

All the plant parts *i.e.* leaves, bark, fruit, seeds and gums are medicinally most important; it is used in diarrhoea, diabetes, throat diseases, toothache, leucorrhoea, menorrhagia, dysentery, piles, haemorrhage, skin diseases and diphtheria.

Flowering : February-March; **Fruiting:** April-Early August.

Local Name: 'Aam'

Siddiqui 31975, Hardoi.

XXXVIII. MORINGACEAE

Moringa Burm.

Moringa pterigosperma Gaertn. Fruct. 2:314, 1791; FBI. 2:45, 1876; van Steenis in Fl. Males. 1(5):554, 1958; Backer & Bakh. Fl. Java, 1:186, 1963; FPP. 63, 1978.

Moringa oleifera Lamk. Encycl. 1:398, 1785.

Guilandina moringa Linn. Sp. Pl. 381, 1753.

A medium sized deciduous tree. **Bark** ash-coloured, thin. **Leaves** 3-pinnate; pinnae 6-12 pairs; leaflets 5-7, ovate or obovate-oblong. **Flowers** in larged axillary panicles, white to creamy-white, zygomorphic. **Sepals** 5, connate, lobes unequal, odd sepals largest and somewhat petaloid. **Petals** 5, unequal, creamy-white with yellow dots, narrowly spathulate. **Stamens** 5, perfect and 5 staminodes; filaments villous at base. **Carpels** 3, connate; ovary densely villous, 1-celled. **Fruit** long, pendant, capsule, 3-valved, ribbed. **Seeds** winged.

Cultivated in house and gardens.

Ethnobotanical uses:

Poultice of fresh leaves is applied to wounds, boils and swellings. Bark is used in asthma, cough and cardiac stimulant. The root bark is stimulant, diuretic, abortifacient and also used in headache and earache.

Flowering : January-April; **Fruiting:** May-June.

Local Name: 'Sajna'

Siddiqui 31921, Shaheed Udhyan.

XXXIX. FABACEAE (PAPILIONACEAE nom. alt.)

Key to Genera:

Leaflet one.

Flowers in various types of inflorescence.

Pods jointed.

Pods compressed, upper suture entire, lower suture shallowly incised .....1. *Desmodium*

Pods turgid, breaking up into 1 - seeded segments; joints swollen .....2. *Alysicarpus*

Pods not jointed.

Plants with hairy pod, single seeded .....3. *Indigofera*

Plants with basifixed hairs; pod glabrous, many - seeded, exerted or included in the persistent calyx .....4. *Crotalaria*

Flowers solitary axillary, throughout the length of branch, yellow; pod long silky hairy (atleast on sutures), a prostrate herb .....5. *Heylandia*

Leaflets two or more.

Leaflets two or three.

Leaflets two, digitate, gland dotted

flowers in racemes, almost concealed
by the bracts;pods jointed, prickly .....6. *Zornia*

Leaflets three.

Leaflets digitate, entire.

A prostrate or erect herb; leaflets small; flowers in raceme; corolla exerted; pods 2-seeded, appresed hairy .....4. *Crotalaria*

An erect small shrub; leaflets large oblique; flowers in large condensed heads; corolla included; pod 1-seeded .....7. *Maughania*

Leaflets pinnate.

Herbs.

Leaflets toothed.

Pods long,slightly falcate .....8. *Trigonella*

Pods short.

Pods spiral or sickle-shaped; racemes short .....9. *Medicago*

Pods not spiral or sickle-

shaped; one seeded; racemes long .....*10. Melilotus*

Leaflets entire.

Climbing or trailing herbs.

Leaves gland - dotted beneath, broadly ovate or rounded; corolla yellow.

Pods 4 - 7 seeded with depressed lines between the seeds; seeds strophiolate .....*11. Atylosia*

Pods two - seeded not with depressed lines between the seeds; seeds not strophiolate .....*12. Rhynchosia*

Leaves not gland dotted beneath, oblong lanceolate, dark-green above, paler beneath; pods straight, brown; seeds dull black with

white blotches;corolla reddish .....13. *Teramnus*

Erect or prostrate, not climbing; flowers pink-purple.

Erect, hairy; hairs centrally fixed; pods subtetragonous septate between the seeds, 3-keeled at the back, 8-12 seeded .....14. *Cyamopsis*

Prostrate;hairs simple pod flat,jointed,upper suture entire, lower shallowly incised joints 3-5 .....1. *Desmodium*

Trees.

Branches prickly; pods 4-5 seeded .....15. *Erythrina*

Branches smooth, pods one-seeded .....16. *Butea*

Leaflets more than three (3 - 5 in *Dalbergia*).

Trees.

Leaflets broadly ovate,

apiculate 3-5, odd pinnate
pods flat, 2 - 3 seeded,
indehiscent apex obtuse
base narrow .....17. *Delbergia*

Leaflets small inner
oblong; pods long, narrow,
terete, dehiscent, septate
between the seeds .....18. *Sesbania*

Herbs or shrubs.

Plants without tendrils.

Climbers.

Style beardless.

Stamens nine;
seeds red and
black,polished
(This plant
maintains fre-
sh green
colour even in
herbarium) .....19. *Abrus*

Stamens ten,
two- adelphous
seeds not
polished; pods
covered with

dense irritant hairs .....20. *Mucuna*

Style bearded inside; flowers bright - blue with orange or white centre .....21. *Clitoria*

Erect or prostrate herbs or shrubs, not climbers.

Leaves streate veined; hairs basi fixed; anthers muticous .....22. *Tephrosia*

Leaves not striate veined hairs centrally fixed; anthers apiculate .....3. *Indigofera*

Plants with tendrils.

Leaflets abortive or two, entire; staminal tube truncate at the mouth .....23. *Lathyrus*

Leaflets 5 - 13 pairs entire; staminal tube oblique at the mouth .....24. *Vicia*

1. **Desmodium** Desv., non. cons.

Key to species:

Leaves 3-foliate.

Flowers in axilarry,umbellate heads; pods silvery pubescent; shrubs .....1. *D. triangulare*

Flowers 1 - 3 axillary; pods not silvery pubescent; small trailing herbs .....2. *D. triflorum*

Leaves 1-foliate.

leaves scabrous above, broadly ovate or suborbicular .....3. *D. velutinum*

Leaves glabrous above, oblong-ovate .....4. *D. gangeticum*

1. **Desmodium triangulare** (Retz.) Merr. Journ. Arn. Arb. 23:170, 1942; Santapau, Kew Bull. 1948:276, 1948; van Meeuwen, Reinwardtia 6:261, 1962; HFDD. 137, 1977.

Hedysarum triangulare Ritz. Observ. Bot. 3:40, 1783.

Hedysarum cephalotes Roxb. Fl. Ind. ed. Carey 3:360, 1832.

Desmodium cephalotes (Roxb.) Wt. & Arn. Prodr. 224, 1834; FBI. 2:161, 1876; FUGP. 1:282 (incl. var. *Conjestum* Prain.); FFSC. 117.

An erect suffruticose shrub or under shrub. **Stem** often triquetrous tending to become terete when old, hairy; hairs white appressed. **Leaves** trifoliate; terminal leaflets the largest, oblong-ovate, acute on both the ends; nerves 8-15, prominent

beneath. Pods silvery pubescent, in axillary ubellate clusters, 2-3 (4) jointed.

Found in scurbby habitat.

Flowering & Fruiting: August-December.

Siddiqui 31577, Chak.

2. **Desmodium triflorum** (Linn.) DC. prodr. 2:334, 1825 (excl. syn. *D. biflorum*); FBI. 2:173, 1876; FUGP. 1:263, Repr. ed. 1960; van Meuwen Reinwardtia 6:261, 1962; HFDD. 138, 1977.

Hedysarum triflorum Linn. Sp. Pl. 749, 1753.

A prostrate, small herb. **Branches** radially spreading, often rooting at the nodes. **Leaves** mostly confined to the basal portion of the branches; leaflets obovate, obcordate, base cuniate, glabrous above, appressed hairy beneath. **Flowers** in axillary leaf opposed clusters of 2-3. **Calyx** appressed hairy. **Corolla** purple. **Pods** 3-5 jointed, curved, pubescent, reticulately veined. **Seeds** compressed, light brown.

Abundant, found in variety of soils from humus rich grasslands to sandy soils of river bed.

Ethnobotanical uses:

Leaves are used as galactagogue and also administered to children as a remedy for diarrhoea caused by indigestion.

Flowering & Fruiting: July-May.

Local Name: 'Kulalia'

Siddiqui 3140Ø2, Madia.

3. **Desmodium velutinum** (Willd.) DC. Prodr. 2:228, 1825; Schindn.

Fedde. Repert. 21:6, 1925; van Meeuwen, Reinwardtia 6:264, 1962; HFDD. 139, 1977.

Hedysarum velutinum Willd. Sp. Pl. 3:117, 18Ø3.

Desmodium latifolium (Roxb.) DC. Prodr. 2:328, 1825; W. & A. Prodr. 225; Brandis For. Fl. 145; FBI. 2:168, 1876; FUGP. 1:164, Repr. ed. 196Ø.

Hedysarum latifolium Roxb. (Hort. Beng. 57, 1814, nom. nud.) Fl. Ind. ed. Carey 3:35Ø, 1832.

An erect, spreading under shrub, densely hairy with simple and hooked (on stem only) hairs. Leaves unifoliate, broadly ovate or orbicular, scabrous above, softly hairy below, base cordate or truncate. Flowers in long, hairy racemes, rachis with simple and hooked hairs. Calyx densely hairy, equalling the corolla. Corolla glabrous, purple. Pods not seen.
Occasionally found in the scrubby situations.

Flowering & Fruiting: October-January.
Siddiqui 315Ø2, Kahoura.

4. **Desmodium gangeticum** (Linn.) DC. Prodr. 2:327, 1825; FBI. 2:168 [incl. var. *maculatum* (Linn.) Baker]; FUGP. 1:287 (incl. var. *maculatum*) Repr. ed. 196Ø; van Meeuwen, Reinwardtia 6:25Ø, 1962; HFDD. 133, 1977.

Hedysarum gangeticum Linn. Sp. Pl. 746, 1753.

Hedysarum maculatum Linn. Sp. Pl. 756, 1753.

Desmodium maculatum (Linn.) DC. Prodr. 2:327, 1825.
Differs from preceding species in having slightly angular stem;

glabrous adaxial surface of the leaves, end the calyx teeth longer than the tube.

Abundant in road sides hedges.

Flowering & fruiting: Rainy and early winter season.

Siddiqui 31431, Bara gaon.

2. **Alysicarpus** Desv., non. cons.

Key to species:

Leaves linear-lanceolate .....1. *A. bupleurifolius*

Leaves broadly - oblong, ovate or orbicular; often decolourised along the midrib.

Pods moniliform .....2. *A. monilifer*

Pods not moniliform .....3. *A. vaginalis*

1. **Alysicarpus bupleurifolius** (Linn.) DC. Prodr. 2:352, 1825; FBI. 2:158, 1876; FUGP. 1:255, Repr. ed. 1960; van Meeuwen, Reinwardtia 6:88, 1961; HFDD. 116, 1977; FPP. 78, 1978.

Hedysarum bupleurifolium Linn. Sp. Pl. 745, 1753.

A suffruticose, nearly erect annual herb. **Leaves** linear-lanceolate, acute; stipules longer than the petiole. **Flowers** pink-purple. **Pods** 2-4 jointed, neither veined nor reticulate.

Found in grassy localities.

Flowering & Fruiting: August-December.

Siddiqui 31442, Kahoura.

2. **Alysicarpus monilifer** (Linn.) DC. Prodr. 2:253, 1825; FBI. 2:157, 1876; FUGP. 1:355, Repr. ed. 1960; FPP. 78, 1978.

Hedyserum moniliferum Linn. Mant. 1:102, 1767.

An annual herb, prostrate or ascending, pluricaulis from the base, hairy. Leaves oblong-elliptic or orbicular, the midrib region often with a white irregular band, glabrous above, hairy below. Flowers creamy-pink in axillary racemes. Pods 4-8 jointed, turgid, moniliform, hairy.

Common in grasslands.

Flowering & Fruiting: August-November.

Siddiqui 31540, Sadai behta.

3. **Alysicarpus vaginalis** (Linn.) DC. Prodr. 2:353, 1825; FBI. 2:158, 1876; FUGP. 1:255, Repr. ed. 1960; Leonard, Bull. Jard. Bot. Brux. 24:84, 1954; van Meeuwen, Reinwardtia 6:87, 1961; HFDD. 118, 1977.

Hedysarum veginale Linn. Sp. Pl. 746, 1753.

Hedysarum nummularifolium sensu Willd. Sp. Pl. 3:1173, 1803 (non Linn. 1753).

Alysicarpus nummularifolius sensu DC. Prodr. 2:353, 1825.

Alysicarpus vaginalis var. *nummularifolius* Miq. Fl. Ind. Bot. 1:232, 1855; FBI. 2:158, 1876; FUGP. 1:277, Repr. ed. 1960.

Hedysarum ovalifolium Schum. Beskr. Guin. Pl. 359, 1825.

Alysicarpus ovalifolius Leonard, Bull. Jard. Bot. Brux. 24:88, 1954.

An annual herb, prostrate, decumbent or nearly erect. **Leaves** elliptic-rounded to oblong, lower broader upper narrower; often with an irregular, white band in the midrib region; stipule ovate, acute, chaffy, parallal veined. **Flowers** 1Ø-15 flowered, lax racemes. **Calyx** equalling the first joint of the part. **Corolla** yellow with pink-red blotch. **Pods** 6-8 jointed, reticulate-veined, faintly pubescent.

Abundant, found in grass land, sandy soil and on old walls.

Flowering & Fruiting: Rainy season.

Siddiqui 314Ø3, Madia.

3. **Indigofera** Linn.

Key to species:

Pods 1-2 seeded; prostrate herbs.

Leaves odd-pinnate; pods 2-seeded .....1. *I. linnaei*

Leaves simple, lanceolate; pods 1-seeded .....2. *I. linifolia*

Pods more than 3-seeded.

Erect, shrubby plants.

Racemes long; calyx densely brown hairy; pods densely hairy .....3. *I. astragalina*

Racemes short; calyx with silvery hairs; pods sparsely hairy with white hairs .....4. *I. tinctoria*

Prostrate herbs; racemes 2 - 4 flowered; corolla caducous .....5. *I. glabra*

1. **Indigofera linnaei** Ali, Bot. Not. 111:549, 1958; HFDD. 114, 1977; FPP. 89, 1978.

Hedysarum prostratum Linn. Mant. Pl. 1:102, 1767 (non. *Indigofera prostrata* Willd. 1803).

Hedysarum prostratum Burm. f. Fl. Ind. 168, t. 55. f. 1, 1768 (non Linn. 1767).

Indigofera enneaphylla Linn. Mant. pl. 2:272, 1771, Append. 571, 1771, nom. illeg.; FUGP. 1:23, Repr. ed. 1960.

A prostrate, hairy annual; hairs white, centrally fixed. Leaflets 5-9, obovate. Flowers in axillary. short racemes, red. Pods in axillary clusters, 2-seeded acute.

Abundant, found in grass lands, on road sides, and raised borders of the fields.

Flowering & Fruiting: Rainy season.

Siddiqui 3147, Raro.

2. **Indigofera linifolia** (Linn. f.) Retz. Observ. Bot. 4:29, 1786; Ibid. 6:33. t. 2, 1791; FBI. 2:92, 1876; FUGP. 1:249, Gillett Kew Bull. Add. Ser. 1:35, 1958; Ali, Bot. Not. 111:546, 1958; FPP. 88, 1978.

Hedysarum linifolium Linn. f. Suppl. 331, 1781.

A prostrate herb, pluricaulous from the base, white hairy. Leaves linear, lanceolate, 1-foliate, appressed white-hairy on both

surfaces. **Flowers** on axillary racemes, red. **Pods** globose, 1-seeded hairy.

Common in waste lands.

Flowering & Fruiting: Rainy season.

Siddiqui 31423, Bhul bhuliya.

3. **Indigofera astragalina** DC. Prodr. 2:228, 1825; Gillett Kew Bull. 14:292-295, 1960; HFDD. 142, 1977; FPP. 87, 1978.

Indigofera hirsuta auct. pl. (non Linn. 1753); Baker, FBI. 2:98, pro parte; FUGP. 1:254, pro parte; Ali Bot. Not. 111:559, 1958.

A small spreading shrub, stem hairy; centrally fixed hairs not very permanent. **Leaves** odd-pinnate; leaflets 5-7, obovate, sometimes slightly unequal sided, shortly petioled, hairy on both the surfaces, darker green above and paler beneath. **Flowers** in long racemes, peduncle hairy; buds erect and closed set, flowers deflexed and distant. **Calyx** densely brown hairy. **Corolla** red purple, longer than the calyx. **Pods** not seen.

Not uncommon, found in waste lands.

Flowering & Fruiting: Rainy season.

Siddiqui 31443, Kahoura.

4. **Indigofera tinctoria** Linn. Sp. Pl. 751, 1753; FBI. 2:99, 1896; FUGP. 1:235, Repr. ed. 1960; FPP. 89, 1978.

An under shrub. **Leaves** odd-pinnate, 7-9 foliate, the terminal leaflet is usually broader than the lateral ones, bluish-green in colour. **Flowers** pink in short spike like racemes. **Pods** blackish, slightly falcate, pointed, suture slightly swollen and lighter in

colour. Whole plant turn black when ripe.

Not uncommon, found in grass lands and waste lands.

Ethnobotanical uses:

The poultice of the leaves is recommended in various skin affections and is used as a stimulating application to old ulcers, haemorrhoides and is also applied to the bites and stings of venomous insects and reptiles to relieve pain, to burn and scalds. Juice of the leaves is used with or without milk in case of dog bite.

Flowering & Fruiting: August-December.

Local Name: 'Neel'

Siddiqui 3145Ø, Charouli.

5. **Indigofera glabra** Linn. Sp. Pl. 751, 1753; Ali, Bot. Not. 111:573, 1958; FPP. 188, 1978.

Indigofera pentaphylla Murr. W. & A. Prodr. 2ØØ; FBI. 2:95, 1876.

Indigofera fragrans Retz. Roxb. Fl. Ind. 3:375.

A slender prostrate annual; branches sometimes ascending. Younger parts hairy, older parts sparsely hairy. **Leaflets** 5, terminal leaflets broader, lateral narrower, hairy on both surfaces. **Flowers** in 2-4 flowered, lax, axillary racemes. **Calyx** densely hairy. **Corolla** red, caducous. **Pods** straight, glabrous; sutures swollen, lighter in colour.

Found in sandy soils.

Flowering & Fruiting: Rainy season.

Siddiqui 314Ø9, Raro.

4. Crotalaria Linn.

Key to species:

Leaves simple.

Pods exerted; flowers yellow.

Plants erect, densely pubescent; leafbase not oblique.....1. *C. mysorensis*

Plants prostrate, thinly hairy; leafbases oblique.....2. *C. prostrata*

Pods not exerted, plants erect; flowers bluish - white; leaves linear-lanceolate .....3. *C. sessiliflora*

Leaves trifoliate, flowers yellow, pods 2-seeded .....4. *C. medicaginea*

1. Crotalaria mysorensis Roth, Nov. Pl. Sp. 338, 1821; FBI. 2:70, 1876; FUGP. 1:188, Repr. ed. 1960; deMunk, Reinwardtia 6:210, 1961; HFDD. 128, 1977.

Crotalaria ferruginea sensu. Duthie, FUGP. 1:203 (non. Grah. ex Benth. 1843).

An erect, golden-brown hairy herb, branched; branches may be divaricate. **Leaves** subsessile or sessile; stipule, elliptic, oblong, lanceolate, entire, obtuse, sometimes mucronate, cuniate, at the base, hiary on both surfaces, gland dotted. **Flowers** crowded towards the apex. **Calyx** densely golden-brown hairy. **Corolla** yellow, not exerted. **Pods** broad, inflated, twice as long

as the calyx. Seeds shining, smooth.

Often found on the edges of the cultivated fields.

Flowering & Fruiting: September-December.

Siddiqui 31491, Sadai behta.

2. **Crotalaria prostrata** Rottl. ex Willd. Enum. Hort. Berol. 2:747, 1809; FUGP. 1:186, Repr. ed. 1960; deMunk, Reinwardtia 6:24, 1961; HFDD. 128, 1977.

Crotalaria prostrata Roxb. (Hort. Beng. 54, 1814, nom. nud.); Fl. Ind. ed. Carey 3:270, 1832; FBI. 2:67, 1876.

An annual herb with prostrate or slightly decumbent branches; branches spreading, hairy. Leaves nearly sessile, entire, obtuse or acute, silvery appressed hairy beneath and brownish hairy above; base unequal. Flowers in 2-5 flowered racemes; bracteoles hairy. Calyx hairy. Corolla hardly exerted. Pods many seeded; seeds beautifull olive-green, polished.

Common within the area,

Flowering & Fruiting: March-June.

Siddiqui 31290, Jhala.

3. **Crotalaria sessiliflora** Linn. Sp. Pl. ed. 2:1004; FBI. 2:73, 1876; FUGP. 1:188, Repr. ed. 1960; Fl. Japan 577, 1965.

An erect herb, pluricaulous from the base. Stem appressedly or spreading white hairy. Leaves linear, lanceolate, shortly pedicelled, hairy below, glabrescent above, entire, acute. Flowers nodding, in few flowered terminal racemes. Calyx densely brown-hairy. Corolla not exerted, bluish-white. Pods included

within the calyx. Seeds dark brown, polished.

Often found among the grasses.

Flowering & Fruiting: September-January.

Siddiqui 31464, Gula mau.

4. **Crotalaria medicaginea** Lamk. Encycl. 2:201, 1786; FBI. 2:81 (incl. var.), 1876; FUGP. 1:190, Repr. ed. 1960; deMunk Reinwardtia 6:208, 1961; HFDD. 127, 1977.

Prostrate or erect, annual hairy herbs; hairs appressed or spreading; in prostrate forms the branches often divaricate. Leaves 3-foliate, petioled, appressed hairy below and thinly hairy or glabrous above; leaflets narrowly obovate, entire, cuneate. Flowers in leaf opposed racemes. Calyx densely hairy, shorter than the corolla. Corolla yellow with red blotches. Pods subglobose, with a pointed beak, appressed hairy. Seeds 2.

Abundant in waste lands and grassy lands.

Flowering & Fruiting; July-December.

Siddiqui 31424, Bhul bhuliya.

5. **Heylandia** DC.

Heylandia latebrosa DC. Mem. Leg. 6:201; W. & A. Prodr. 180; Royle I 11. 191; FBI. 2:65, 1876; FUGP. 1:185, Repr. ed. 1960.

A small deep rooted annual herb, prostrate, branching from the base in all directions; branches thinly hairy with long, golden, spreading hairs. Leaves shortly petioled, entire, acute, base cordate, equal or unequal; margins with scattered long hairs. Flowers solitary, axillary, shortly pedicelled, throughout the

length of branches. **Corolla** yellow. **Pods** pubescent when young but thinly hairy at maturity, with a persistent styler base; mature pod flat.

Often found along Railway track.

Flowering & Fruiting: February-May.
Siddiqui 31236, Hardoi.

6. **Zornia** Gmel.

Zornia gibbosa Span. Linnaea 15:192, 1841; Mohlenbrock, Webbia 15:112, 1961; Dandy & Milne-Redhead Kew Bull. 17:74, 1963; HFDD. 173, 1977.

Zornia diphylla auct. pl.(non. Pers. 1807); FBI. 2:147, pro parte; FUGP. 1:247, Repr. ed. 1960.

An annual, prostrate or nearly erect herb. **Stem** glabrous or hairy. **Leaves** digitately 2-foliate, lanceolate, acute at both the ends or oblique rounded at the base; usually black dotted below, stipulate; stipules black punctate. **Flowers** in flat, lax, bracteate, spikes of variable length. **Bracts** nearly concealing the flowers and resembling the stipules. **Corolla** yellow. **Pods** exerted, 2-7 segmented; segments with hooked retrorsely hairy bristles.

Abundent in grassy, shaddy and damp localities.

Flowering & Fruiting: Rainy and winter season.
Siddiqui 31578, Chak.

7. **Maughania** J. St. Hil., non. cons.

Maughania macrophylla (Willd.) O. Kuntze, Rev. Gen. Pl. 1:199, 1891; Li, Amer. Journ. Bot. 31:226, 1944; Mukerjee, Bull. Bot. Soc. Beng. 6:16, 1952 [incl. *M. prostrata* (Roxb.) Mukerjee, *M. semialata* (Roxb.) Mukerjee, *M. stricta* (Roxb.) O. Kuntze,]; HFDD. 149, 1977.

Crotalaria macropylla Willd. Sp. Pl. 3;982, 1800.

Flemingia congesta Roxb. (Hort. Beng. 98, 1814, nom. nud.) Fl. Ind. ed. Carey 3:340, 1832; FBI. 2:228 (incl. var. *semialata*); FUGP. 1:201, Repr. ed. 1960.

An erect, woody shrub. **Leaves** alternate, long, petioled, 3-foliate; terminal leaflets broadly lanceolate, lateral leaflets unequal and oblique at the base; outer base of both the leaflets are cordate or rounded, white the inner ones are cuniate or acute. **Leaves** red tinged or blotched. **Flowers** in condensed racemes, shorter than the petiole. **Pods** turgid, slightly pubescent; persistent, style base eccentric. **Seeds** 2, red-brown.

Found near villages.

Flowering & Fruiting: Rainy to winter season.

Siddiqui 31594, Asgaon.

8. **Trigonella**

Key to species:

Stipules lanceolate.

Calyx segments shorter than the

tube; pods tranversely veined,
5-8 seeded .....1. *T. corniculata*

Calyx divided halfway down; pods
not transversely veined; 10-20
seeded .....2. *T. foenum-graecum*

Stipules semi-segittate .....3. *T. incisa*

1. **Trigonella corniculata** Linn. Syst. Nat. ed. 10. 1180, 1759; FBI. 2:88, 1876; FUGP. 1:193, Repr. ed. 1960; HFDD. 167, 1977.

A prostrate or suberect, extensively branched annual. **Leaves** trifoliate; leaflets obovate, rounded, emarginate, cuneate, serrate. **Flowers** yellow, in dense racemes, pedicelled. **Corolla** longer than the calyx. **Pods** falcate-oblong, transversely veined, 5-8 seeded.

Very common in grass lands.

Flowering & Fruiting: February-May.

Siddiqui 31244, Reddupur.

2. **Trigonella foenum-graecum** Linn. Sp. Pl. 777, 1753; FBI. 2:87, 1876; FUGP. 1:192, Repr. ed. 1960; HFDD. 167, 1977.

An erect, branched herb with a characteristic smell. **Leaflets** obovate, faintly serrate at the top. **Flowers** sessile, yellow. **Pods** straight, with a long persistent beak, without transverse reticulation, hairy.

Often cultivated for the spices and green vegetables.

Ethnobotanical uses:

Leaves are used in leucorrhoea and to reduce swellings, paste of

it is applied over swellings and burns. Seeds are demulcent, emmenagogue, aromatic, diuretic, lactagogue, astringent, carminative and aphrodisiac. They are eaten boiled or roasted as vegetable in despepsia, diarrhoea, dysentery, cholic, rheumatism, enlargement of liver. Decoction of seeds is also used in earache.

Flowering & Fruiting: January-May.

Local Name: 'Methi'

Siddiqui 3120Ø9, Khera.

3. Trigonella incisa Benth. in Royle I 11. 197, 1835; Kitamura Fl. Afgh. 213, 196Ø; Fl. Delhi, 115, 1963; Suppl. FUGP. 61, 1976; FPP. 1Ø1, 1978.

An extensively branched, spreading or ascending annual herb. Stem sulacte, thinly puberulous, basal part red tindged. Leaves trifoliate; leaflets cuneate, sharply dentate, hairy, more so on adaxial surface and on nerves; nerves 3-6 pairs; stipules semi-segittate. Flowers in few flowered axillary racemes, yellow. Pods long, falcate, reticulately veined. Seeds 12-18, rhomboid, tubercled, yellow.

Occasionally found in cultivated fields.

Flowering & Fruiting: January-March.

Siddiqui 31226, Etouli.

9. Medicago Linn.

Key to species:

Pods 1-seeded, without hooked projection
usually blackish in colour .....1. *M. lupulina*

Pods more than 1-seeded, spiral, with hooked projection,yellow-brown in colour.....2. *M. polymorpha*

1. **Medicago lupulina** Linn. Sp. Pl. 779, 1753; Urb. Vern. Bot. Ver. Brandenb. 15:52, 1873; FBI. 2:90, 1876; FUGP. 1:194, Repr. ed. 1960; HFDD. 151, 1977.

A prostrate annual herb. **Stem** appressed hairy-spreading hairy. **Leaves** trifoliate; leaflets obovate, cuneate at the base, apex notched, with a short mucro, lower margins entire, top dentate. **Calyx** divided half way down. **Pods** many in a clusters, turning black on ripening, sickle-shaped, faintly reticulate.

Usually found on the beds of the canals and streams when they dry up in water. Also found in grasslands.

Flowering & Fruiting: Winter season.

Siddiqui 31595, Asgaon.

2. **Medicago polymorpha** Linn. Sp. Pl. 779, 1753; Shinners, Rhodora 58:310, 1956; Van Ootstroom & Reichgelt Act. Bot. Neerland. 7:95, 1958; HFDD. 151, 1977.

Medicago hispida Gaertn. Fruct. Sem. 2:349, 1791:Urb. Verh. Bot. Vor. Brandenb 15:113, 1873; Fl. Japan 577, 1963.

Medicago leppaceae Desr. in Lamk. Encycl. 3:637, 1792.

Medicago denticulata Willd. Sp. Pl. 3:1414, 1803; FBI. 2:90, 1876; FUGP. 1:194, Repr. ed. 1960.

A procumbent or straggling herb. **Leaflets** ovate, dentate; stipules lacinate. **Flowers** in 2-6 flowered racemes, bright yellow. **Pods** 2-4 coiled, covered with double rows of hooked

bristles, 2 or more seeded.

Very common in grass lands.

Flowering & Fruiting: January-April.

Siddiqui 31210, Khera.

10. **Melilotus** Mill.

Key to species:

Flowers yellow .....1. *M. indica*

Flowers white .....2. *M. alba*

1. **Melilotus indica** (Linn.) All, Fl. Pedem. 1:308, 1785; FUGP. 1:191, Repr. ed. 1960; HFD. 153, 1977.

Trifolium indicum Linn. Sp. Pl. 765, 1753.

Melilotus parviflora Desf. Fl. Atlant. 2:192, 1798; FBI. 2:89, 1876.

An erect, branched annual herb. **Leaves** 3-foliate; leaflets obovate, acutely serrate, cuneate at the base, rounded at the apex. **Racemes** dense, axillary. **Calyx** shorter than the petals, teeth deltoid. **Corolla** yellow. **Pods** glabrous, one-seeded.

Abundant, found in grass lands, lawns, waste lands.

FLowering & Fruiting: Winter season.

Siddiuqi 31541, Sadai behta.

2. **Melilotus alba** Medik. (Vorles. Churpf. Phys. Ges. 2:382, 1787. nom. nud.) ex Desr. in Lamk. Encycl. 4:63, 1797; FBI. 2:89, 1876; Mansf. Fedde. Repert. 49:45, 1940; HFDD. 153, 1977.

The plant can be easily distinguished from the preceding species

by its larger size, larger white flowers, racemes and pods. Some times this plant attains a height upto 150-160 cm.

A very common in agricultural fields.

Flowering & Fruiting: Winter season.

Siddiqui 31503, Kahoura.

11. **Atylosia** Wt. & Arn.

Key to species:

Leaves densely grey hairy; pods densely hairy not reticulately veined .....1. *A. scarabaeoides*

Leaves with scattered hairs; pods distinctly reticulately veined .....2. *A. platycarpa*

1. **Atylosia scarabaeoides** (Linn.) Benth. in Miq. Pl. Jungh. 243, 1852; FBI. 2:215, 1876; FUGP. 1:196, Repr. ed. 1960; HFDD. 121, 1937.

Dolichos scarabaeoides Linn. Sp. Pl. 2:1020, 1753.

A medium sized climber with a woody base. **Branches** a grooved, grey hairy, younger parts ferruginous hairy. **Leaves** trifoliate, petioled; terminal leaflets oblong-elliptic, obtuse; lateral leaflets oblique, all grey tomentose. **Flowers** in 2-5 flowered axillary racemes. **Calyx** densely grey silky; teeth longer than the tube. **Corolla** exerted, yellow. **Pods** densely hairy not reticulate veined, persistent style base eccentric, septate between the seeds.

Found in grass lands and among the bushes near the villages.

Flowering & Fruiting: Late rainy season and winter season.

Siddiqui 31524, Saktapur.

2. **Atylosia platycarpa** Benth. in Miq. Pl. Jungh. 243, 1852; FBI. 2:216, 1876; FUGP. 1:196, Repr. ed. 1960; HFDD. 120, 1977.

A prostrate herb, internodes long. **Stems** thinly hairy with long and short hairs. **Leaves** long-petioled, trifoliate; terminal leaflets broadly rhomboid, entire, thinly hairy, base cuneate, apex acute; lateral leaflets oblique, acute. The terminal leaflets are relatively smaller than the laterals. **Flowers** in 1-2 leaves axils, yellow. **Pods** flattish, thinly hairy, distinctly reticulate, curved. The persistent styler base eccentric, towards the concave suture, 5-7 seeded.

Often found within the area.

Flowering & Fruiting: August-December.

Siddiqui 31453, Etouli.

12. **Rhynchosia** Lour., non. cons.

Rhynchosia minima (Linn.) DC. Prodr. 2:385, 1825; FBI. 2:223, 1876; FUGP. 1:204, Repr. ed. 1960; Nooteboom, Reinwardtia 5:439, 1961; HFDD. 160, 1977.

Dolychos minimus Linn. Sp. Pl. 1020, 1753.

A small twinning or trailing annual herb. **Stem** slender, shortly hairy. **Leaves** trifoliate, petioled; the terminal leaflets rhomboid, acute; laterals ovate-elliptic, glabrous except the hairy nerves, glands dotted beneath. **Flowers** in axillary, long peduncled 5-10 flowered racemes. **Calyx** divided half way down.

Corolla longer than the calyx, yellow, purplish streaked. Pods oblong-falcate, shortly gland hairy, 2-seeded, shortly beaked.

Commonaly found among hedges on road sides and the edges of orchards.

Flowering & Fruiting: April-November.

Siddiqui 313Ø7, Atwa.

13. **Teramnus** Sw.

Teramnus labialis (Linn. f.) Spreng. Syst. 3:235, 1826; FBI. 2:184, 1876; FUGP. 1:214, Repr. ed. 196Ø.

Glycine labialis Linn. Roxb. Fl. Ind. 3:318; W. & A. Prodr. 2Ø8; D. & G. Bomb. Fl. 68.

A medium sized climber. Nearly all parts, more or less black gland dotted, but the gland more frequent on the stem. Stem shortly hairy, angular. Leaves trifoliate, all the 3 leaflets nearly similar, oblong-lanceolate, obtuse, entire, glabrous and greyish above, hairy beneath, the halves slightly unequal, nerves more prominent below; lateral nerves 5-7 pairs. Flowers in lax, axillary 3-6 flowered racemes. Corolla reddish. Pods linear, acute, 7-11 seeded. Seeds brown-black.

Occassionally found in the area.

Flowering & Fruiting: August-November.

Siddiqui 31444, Kahoura.

14. **Cyamopsis** DC.

Cyamopsis tetragonoloba (Linn.) Taub. Pflanzenfam. 3:259, 1894; Gillett, Kew Bull. Add. Ser. 1:6-8, 1958; Raizada, Ind. For. Rec. 5(1):13, 1958; HFDD. 131, 1977.

Psoralea tetragonoloba Linn. Mant. Pl. 104, 1767.

Dolichos psoralioides Lamk. Encycl. 2:300, 1786.

Cyamopsis psoralioides (Lamk.) DC. Mem. Leg. 231, 1825; Prodr. 2:216, 1825; FBI. 2:92, 1876; FUGP. 1:228, Repr. ed. 1960.

An erect tall herb with sulcate and hairy stem, hairs only on ridges. **Leaves** trifoliate, petioled; leaflets hairy on both the surfaces. Hairs on adaxial surface, finer and scathered, white; on abaxial surface, coarse and denser; terminal leaflets elliptic-ovate, acute on both the ends, distantly dentate; lateral leaflets slightly oblique, or with unequal halves, there is a slight difference between the length of petiolules of both the lateral leaflets of the same pair; lateral nerves 4-6 pairs. **Flowers** in axillary short racemes, shortly pedicelled, purplish. **Ovary** densely hairy. **Pods** hairy in initial stage later glabrous.

Often cultivated as fodder crop.

Flowering & Fruiting: October-January.

Siddiqui 31512, Atwa.

15. **Erythrina** Linn.

Erythrina suberosa Roxb. Hort. Beng. 53, 1814, nom. nud. & Fl. Ind. 3:253, 1832; FBI. 2:189, 1876; FUGP. 1:220, Repr. ed. 1960; Ind. Tr. 227, Repr. ed. 1971; FPP. 86, 1978.

A medium sized tree. Trunk crooked, armed with prickles, young parts and inflorescence tomentose. **Leaflets** rhomboid, deltoid, abruptly acuminate. **Racemes** several at the ends of branches, erect. **Flowers** coral-red, in fascicles of 2-3. **Pods** subterete, 4-5 seeded.

Cultivated as ornamental.

Flowering & Fruiting: March-June.

Siddiqui 31293, Jhala.

16. **Butea** Koen ex Roxb., nom. cons.

Butea monosperma (Lamk.) Taub. in Engl. & Prantl, Pflanzenfam. 3(3):366, 1894; Raizada, Ind. For. 5(1):9, 1958; FPP. 80, 1978.

Erythrina monosperma Lamk. Encycl. 1:391, 1783.

Butea frondosa Koenig ex Roxb. Journ. As. Res. 3:469, 1792 & Pl. Cor. 1:21, t. 21, 1795; FBI. 2:194, 1876; FUGP. 1:221, Repr. ed. 1960.

A medium sized tree; bark rough, a red gum exudes from the cracks in the bark. **Leaves** 3-foliate; terminal leaflets largest, broadly obovate-rhomboid, paler beneath, base cuneate; the laterals smaller, oblique ovate. **Flowers** in terminal and axillary racemes, appearing before the leaves. **Calyx** densely black tomentose. **Petals** orange-red, grey silky pubescent outside. **Pods** oblong-obtuse, reddish-brown, compressed.

Planted in gardens orchards and very common in nearby forest tracts.

Ethnobotanical uses:

Leaves and flowers are astringent, diuretic, aphrodisiac. They are given in diarrhoea, colic, piles and worms. Seeds are used in skin diseases. Gum of the plant is given to the patient of diarrhoea and dysentery. Decoction of the bark is given for cold, cough and catarrh.

Flowering & Fruiting: March-June.

Local Name: 'Dhak' or 'Palas'

Siddiqui 31227, Etouli.

17. Dalbergia Linn. f.

Dalbergia sissoo Roxb. Hort. Beng. 53, 1814, nom. & Fl. Ind. 3:223, 1832; FBI. 2:231, 1876; FUGP. 1:243, Repr. ed. 1960; FPP. 84, 1978.

A large decidous tree. Bark dark-grey, longitudinally furrowed. Leaflets odd pinnate; 3-5, alternate, broadly ovate-rhomboid, abruptly acuminate, pubescent when young and gabrous when mature, sometimes finely appressed hairy beneath. Flowers in axillary panicles, pale-yellow, shortly pedicelled. Stamens a, monadelphous. Ovary pubescent; style much shorter than the ovary. pods linear-lanceolate, compressed, 1-3 seeded.

Extensively planted as an important timber tree.

Flowering & Fruiting: March-June.

Siddiqui 31289, Lucknow Road.

18. **Sesbania** Linn.

Key to species:

Unarmed tree; leaflets 14 - 20 pairs; wings with a minute or obscure, obtuse auricle .....1. *S. sesban*

Armed herbaceous shrub; leaflets 20-40 pairs;wings without a minute or obscure obtuse auricle .....2. *S. bispinosa*

1. **Sesbania sesban** (Linn.) Merr. in Philipp. Journ. Sci. Bot. 7:235, 1912; FPP. 96, 1978.

Aeschynomene sesban Linn. Sp. Pl. 714, 1753.

Sesbania aegyptiaca Poir in Lamk. Encycl. 7:120, 1806; FBI. 2:114, 1876; FUGP. 1:223, Repr. ed. 1960.

A small tree with white and soft wood. Branches unarmed. Leaflets 14-20 pairs, small. Flowers in lax 6-12 flowered axillary racemes, yellow with purple blotches; wings with a minute or obscure, obtuse auricle. Pods torulose, 20-30. Seeds compressed, oblong, ellipsoid, yellowish-brown.

Often planted near villages.

Flowering & Fruiting: November-April.
Siddiqui 31981, Shaheed Udhyan.

2. **Sesbania bispinosa** (Jacq.) Fawcett & Rendle, Fl. Jam. 4:24, 1920; FPP. 95, 1978.

Aeschynomene bispinosa Jacq. Icon. Pl. Rar. 3:t. 564, 1793.

Sesbania aculeata Pers. Syn. Pl. 2:316, 18Ø7; FBI. 2:114, 1876; FUGP. 1:234, Repr. ed. 196Ø.

An erect branched annual shrub, usually branching in upper half; stem branchlets and leaf rachis beset with scattered, curved prickles. **Leaflets** 2Ø-4Ø pairs, linear-oblong, small. **Flowers** 2-6 in short axillary racemes. **Calyx** teeth short. **Corolla** yellow with red blotches, wings without a minute or obscure, obtuse auricle. **Pods** straight, beaked, submoniliform.

Commonaly found in cultivated fields.

Flowering & Fruiting: September-November.

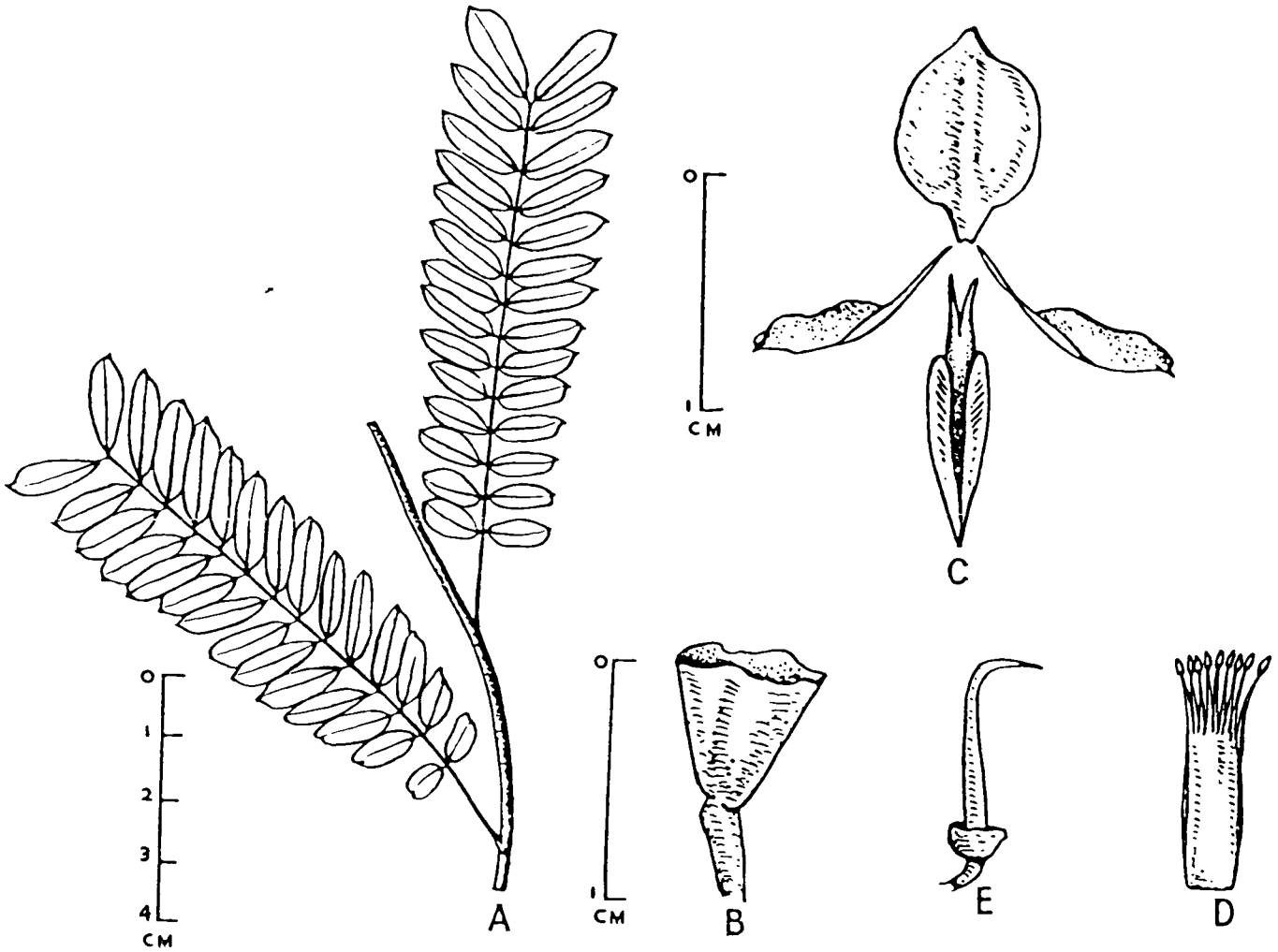
Siddiqui 31492, Sadai behta.

19. **Abrus** Adans.

Abrus precatorius Linn. Syst. Nat. ed. 12. 472, 1767; FBI. 1:175, 1876; FUGP. 1:241, Repr. ed. 196Ø; Breteler, Blumea 1Ø:613, 196Ø; HFDD. 114, 1977.

Glycine abrus Linn. Sp. Pl. 753, 1753.

A woody medium sized climber. **Stem** slender, woody at the base, younger portions silky tomentose, older portions thinly hairy. **Leaflets** 12-2Ø pairs, elliptic-oblong, glabrous above, thinly silky beneath. The leaves retain their fresh green colour in herbarium specimens over a long period. **Flowers** in short axillary and terminal racemes, lower flowers bisexual, upper male. **Corolla** purple-white. **Pods** oblong, turgid, thinly silky-pubescent, 3-6 seeded, septate between seeds. **Seeds** subglobose, bright-red with a black area around the hilum.



Abrus prectorius Linn

Very common among hedges and road sides.

Ethnobotanical uses:

Paste of the leaves is used in swellings, rheumatism and skin diseases. Paste of seeds and root is used in leucoderma patches. Paste of the seeds is also used in as a rubifacient in sciatica, paralysis, skin diseases, ulcers and inflammations. For alopecia it is rubbed on the exposed skin of the scalp.

Flowering & Fruiting: July-January.

Local Name: 'Ghungechi' or 'Ratti'

Siddiqui 31410, Raro.

20. **Mucuna** Adans., nom. cons.

Mucuna pruriens (Linn.) DC. Prodr. 2:403, 1825; FBI. 2:187, 1876; FUGP. 1:218, Repr. ed. 1960; Merr. Philipp. Journ. Sci. 5:117, 1910; Enum. Philipp. Flow. Pl. 2:309, 1925; Backer & Bakh. f. Fl. Java 1:629, 1963; HFDD. 153, 1977.

Dolichos pruriens Linn. Amoen. Acad. 4:132, 1759; Syst. Nat. ed. 10. 1162, 1759.

Mucuna prurita Hook. Bot. Misc. 2:348, 1831; Santapau, Rec. Bot. Ind. ed. 3. 16:64, 1967.

An extensively climbing annual, herbaceous. **Leaves** 3-foliate, leaflets ovate-rhomboid, apex rounded, retuse, mucronate, appressed lustrous hairy beneath. **Flowers** in large pendulous racemes. **Calyx** divided half way down, appressed hairy with brown, stinging hairs. **Corolla** dark-purple. **Pods** 4-6 seeded, longitudinally ridged, recurved in lower half. Clotched with dense,

pale-brown, irritant bristles. Seeds shining dark-brown with light coloured blotches.

Found among the hedges near villages.

Flowering & Fruiting: August-January.

Siddiqui 31445, Kahoura.

21. Clitoria Linn.

Clitoria ternatea Linn. Sp. Pl. 753, 1753; FBI. 2:209, 1876; FUGP. 1:213, Repr. ed. 1960; FPP. 81, 1978 (*C. ternata*).

An extensive, herbaceous climber. Stem appressed hairy. Leaves imparipinnate; leaflets 5, slightly hairy beneath on the veins otherwise glabrous,stipules relatively broader than the stipules. Flowers solitary or paired, axillary, pedicelled; bracts linear-lanceolate, hairy, one or two nerved; bracteoles larger, orbicular, cordate, entire, extensively innervated, apex rounded or retuse. Calyx membranous. Corolla blue with a white centre. Pods linear-oblong, beaked, flat, 6-10 seeded.

Introduced as an ornamental, but has now got naturalised and established as a wild plant.

Ethnobotanical uses:

Juice of the leaves is used in earache. The roots are diuretic, demulcent its powder is given in gonorrhoea and irritations of bladder and urethra.

Flowering & Fruiting: May; April.

Local Name: 'Gokerni'

Siddiqui 31338, Etouli.

22. **Tephrosia** Pers., nom. cons.

Tephrosia purpurea (Linn.) Pers. Syn. 2:239, 1807; FBI. 2:112, 1876; FUGP. 1:225, Repr. ed. 1960; FPP. 100, 1978.

Cracca purpurea Linn. Sp. Pl. 752, 1753.

A much branched undershrub, woody at base. Young branches grey tomentose. Leaves imparipinnate; leaflets 7-19, oblong-obovate, appressed hairy beneath. Flowers in axillary or terminal racemes, bright purple. Pods linear, compressed, 4-6 seeded.

Common in sandy soil.

Ethnobotanical uses:

Plant mixed with the leaves powder of *Cannabis sativa* Linn. and used as a remedy for bleeding piles, and with black pepper (*Piper nigrum* Linn.) in gonorrhoea. Seeds of the plant are used in asthma.

Flowering & Fruiting: May-December.

Local Name: 'Sarpokha'

Siddiqui 31579, Chak.

23. **Lathyrus** Linn.

Key to species:

Stem winged; stipules semiseggittate at the base .....1. *L. sativus*

Stem not winged; stipules linear or foliaceous.

Leaves well developed; stipules

linear; flowers red .....2. *L. sphaericus*

Leaves abortive; stipules foliaceous; flowers yellow .....3. *L. aphaca*

1. **Lathyrus sativus** Linn. Sp. Pl. 730, 1753; FBI. 2:179, 1876; FUGP. 1:240, Repr. ed. 1960; Ali Biologia. 11:1-10, 1965; HFDD. 147, 1977.

A glabrous much branched annual, with quadrangular, green and winged stem. **Leaves** 2-foliate, petiole winged, rachis ending in a simple or trifid tendril; leaflets linear-lanceolate, entire, acute, with 3 main nerves. **Stipules** semisaggittate at the base, margins slightly ciliate. **Flowers** solitary axillary, penduncles longer than the petiole, with two appendages near the base of flower one being smaller and the other slightly larger. **Calyx** campanulate, divided nearly half way down, each tooth single nerved. **Corolla** reddish purple. **Stamens** 10 (9+1), the mouth of the tube oblique. **Style** curved at right angle; stigma flattened and bearded. **Pods** with conspicuous wings on either side of the dorsal suture.

Common in cultivated fields.

Flowering & Fruiting: December-April.

Siddiqui 31596, Asgaon.

2. **Lathyrus sphaericus** Retz. Observ. Bot. 3:39, 1784; FBI. 2:180, 1876; FUGP. 1:240, Repr. ed. 1960; Ali Biologia. 11:1-10, 1963; HFDD. 147, 1977.

A decumbent or erect-glabrous annual. **Stem** wingless. **Leaves**

2-foliate, petiole winged; leaflets linear, lanceolate, acute, stipules linear, semisaggittate, **Flowers** red, solitary, axillary. **Calyx** divided half way down. **Pods** linear, wingless, glabrous.

Occasionally found among the grasses.

Flowering & Fruiting: November-April.

Siddiqui 31560, Baturi purva.

3. **Lathyrus aphaca** Linn. Sp. Pl. 729, 1753; FBI. 2:179, 1876; FUGP. 1:239, Repr. ed. 1960; HFDD. 146, 1977.

A much branched, ascending annual, branching from near the base. **Stem** wingless. **Leaves** abortive. **Stipules** foliaceous, paired, appressed to the stem, parallel veined, truncate, hastate, entire and acute; tendrils unbranched, long than the stipules. **Flowers** 1-2 on a peduncle exceeding the stipule; yellow. **Pods** oblong, glabrous, slightly curved, 3-7 seeded, internally with faint hairy lines between the seeds.

Abundant on the borders of agricultural fields.

Flowering & Fruiting: November-April.

Siddiqui 31542, Sadai behta.

24. **Vicia** Linn.

Key to species:

Erect herbs; flowers white, with blakish blotch near the corolla base .....1. *V. faba*

Climbing or prostrate herbs.

Leaflets 3-5 pairs; flowers pink-

violet; corolla much exserted; pods 6-10 seeded .....2. *V. sativa*

Leaflets 8-11 pairs; flowers lilac; corolla hardly exserted; pods two-seeded .....3. *V. hirsuta*

1. **Vicia faba** Linn. Sp. Pl. 737, 1753; FUGP. 1:239, Repr. ed. 1960; HFDD. 171, 1977.

An annual herb. **Stem** 4-angled. **Leaflets** 2-3 pairs, elliptic-oblong, rachis not ending into a tendril but flaccid apical point. **Flowers** in 2-5 flowered erect racemes, creamy-white with blackish blotch. **Pods** thick, linear, velutinous, 4-5 seeded.

Cultivated for green pods.

Flowering & Fruiting: November-February.

Siddiqui 31942, Hardoi.

2. **Vicia sativa** Linn. Sp. Pl. 736, 1753; FBI. 2:178, 1876; FUGP. 1:238, Repr. ed. 1960; HFDD. 171, 1977.

An annual slender tendril climber or suberect herb. **Stem** angular, glabrous or obscurely downy. **Stipules** small, lanceolate, oblique deeply toothed and cuspidate, base sagittate or with a single auricle. **Leaves** peripinnately compound, leaflets 3-5 pairs, elliptic lanceolate, shortly petioled, margins shortly ciliate, mucronate. **Flowers** solitary or paired. **Calyx** hairy, teeth lanceolate, subulate, mouth oblique. **Corolla** reddish-blue, twice the calyx. Mouth of the staminal tube oblique, hairs on the lower side are longer than on the either side. **Pods** 6-10 seeded.

Abundant in wheat fields.

Flowering & Fruiting: Cold season.

Siddiqui 31580, Chak.

3. **Vicia hirsuta** (Linn.) S. F. Gray, Nat. Arv. Brit. Pl. 2:614, 1821; FBI. 2:614, 1821; FBI. 2:177, 1876; FUGP. 1:238, Repr. ed. 1960; HFDD. 171, 1977.

Ervum hirsutum Linn. Sp. Pl. 738, 1753.

A scarcely hairy or almost glabrous climbing annual. **Stipules** semisaggittate, often toothed at the base, which may sometimes be quite long, hairy. **Leaves** very shortly petioled; leaflets 8-11 pairs, entire, apex truncate and mucronate, upper surface has very distinct opaque dots, peduncles much shorter than the leaves, 2-4 flowered. **Corolla** white, slightly exserted. **Stigma** hairy all around. **Pods** short, constricted between the seeds when mature, 2-sseded.

Abundant in wheat fields.

Flowering & Fruiting: Cold season.

Siddiqui 31561, Baturi purva.

The following plants are often cultivated:

1. **Lens culnaris** Medic. in Vorks. Churpf. Phys. Ges. 2:361, 1787; HFDD. 148, 1977.

Lens esculenta Moench. Meth. 131, 1794.

Cultivated as pulse crop.

Flowering & Fruiting: January-Late March.

Local Name: 'Masoor'

Siddiqui 31914, Sitapur road.

2. Cicer arietinum Linn. Sp. Pl. 738, 1753; FBI. 2:176, 1876; FUGP. 1:236, Repr. ed. 1960; HFDD. 123, 1977.

Cultivated as pulse crop.

Flowering & Fruiting: January-April.

Local Name: 'Chana'

Siddiqui 31211, Khera.

3. Pisum sativum Linn. Sp. Pl. 727, 1753; FBI. 2:181, 1876; FUGP. 1:241, Repr. ed. 1960; HFDD. 159, 1977.

Cultivated extensively within the area for green immature seed vegetable and pulse.

Flowering & Fruiting: December-April.

Local Name: 'Matar'

Siddiqui 31597, Asgaon.

4. Cajanus cajan (Linn.) Mill. Sp. in field columb. Mus. Bot. 2:53, 1900.

Cytisus cajan Linn. Sp. Pl. 739, 1753.

Cajanus indicus Spreng. Syst. 3:348, 1826; FBI. 2:217, 1876; FUGP. 1:197, Repr. ed. 1960.

Cultivated as pulse crop.

Flowering & Fruiting: September-April.

Local Name: 'Arhar'

Siddiqui 31308, Atwa.

5. **Phaseolus aureus** Roxb. Hort. Beng. 55, 1814; HFDD. 156, 1977.

An erect to decumbent annual herb, hispid hairy. **Leaves** pinnately 3-foliate. **Flowers** in axillary racemes, yellowish green. **Pods** patent-reflexed, hispid hairy 10-12 seeded. **Seeds** green with minute hilum.

Cultivated as a pulse crop.

Flowering & Fruiting: August-October.

Local Name: 'Mung'

Siddiqui 31437, Kahoura.

6. **Phaseolus mungo** Linn. Mant. 101, 1767; FBI. 2:203, 1876; FUGP. 1:208, Repr. ed. 1960.

Similar to the preceding species but the seeds are mostly blackish-green and larger in size.

Cultivated as pulse crop.

Flowering & Fruiting: August-October.

Local Name: 'Urd'

Siddiqui 31454, Charouli.

7. **Vigna unquiculata** (Linn.) Walp. Repert. 1:779, 1842; HFDD. 172, 1977.

Dolichos Unquiculatus Linn. Sp. Pl. 725, 1753.

Vigna sinensis Linn. Cent. Pl. 2:28, 1756.

Vigna catiang Wallp. in Linnaea 13:533, 1839; FBI. 2:205, 1876; FUGP. 1:209, Repr. ed. 1960.

Cultivated within the area in kitchen gardens and fields.

Flowering & Fruiting: August-November.

Local Name: 'Lobia'

Siddiqui 31436, Kahoura.

8. Arachis hypogea Linn. Sp. Pl. 741, 1753.

Cultivated in sandy soils.

Flowering & Fruiting: August-September.

Local Name: 'Moongphali'

Siddiqui 31465, Gula mau.

9. Dolichos lablab Sp. Pl. 725, 1753; FBI. 2:209, 1876; FUGP. 1:210, Repr. ed. 1960; HFDD. 140, 1977.

Lablab vulgaris Savi. Diss. 19, 1821 & Obs. Phas. & Dal. 19, 1822.

Cultivated in kitchen gardens.

Flowering & Fruiting: Almost round the year.

Loacl Name: 'Sem'

Siddiqui 31237, Kundouli.

10. Trifolium alexandrinum Linn. Cent. Pl. 1:25, 1755; Amoen. Acad. 4:286, 1759; Hossain, Notes Roy. Bot. Gard. Edinb. 23:425, 1961; HFDD. 165, 1977.

Cultivated as fodder crop.

Flowering & Fruiting: October-April.

Local Name: 'Barseem'

Siddiqui 3150⁴, Kahoura.

11. **Crotalaria juncea** Linn. Sp. Pl. 714, 1753; FBI. 2:79, 1876; FUGP. 1:190, Repr. ed. 1960; deMunk, Reinwardtia 6:206, 1961; HFDD. 127, 1977.

An erect herb with angular-ribbed stem. **Leaves** simple, linear-lanceolate, stipulate. **Flowers** in terminal lax racemes, bright yellow, often tinged with reddish-purple vein. **Stamens** 10, monadelphous, dimorphic. **Pods** oblong, turgid, densely patently hairy.

Cultivated within the area.

Flowering & Fruiting: August-November.

Siddiqui 31449, Charouli.

12. **Sesbania grandiflora** (Linn.) Pers. Syn. 2:316, 1807; FBI. 2:115, 1876; FUGP. 1:224, Repr. ed. 1960.

Aeschynomene grandiflora Linn. Sp. Pl. 1050, 1762.

A small to medium size tree with drooping branches. **Leaves** paripinnate; leaflets in 15-25 pairs, linear oblong, appressed hairy on both surfaces. **Flowers** axillary peduncled racemes, pink. **Pods** pendulous linear, terete compressed, 15-20 seeded, obscurely constricted between the seeds. **Seeds** oblong-ellipsoid-compressed, brown.

Cultivated in gardens and in parks as an ornamental tree.

Flowering & Fruiting: September-May.

Siddiqui 31905, District Board Office.

XL. CAESALPINIACEAE

Key to Genera:

Leaves 1-pinnate; pods unarmed .....*1. Cassia*

Leaves bi - pinnate; pods armed with prickles .....*2. Caesalpinia*

1. **Cassia** Linn.

Key to Species:

Prostrate are decumbent herbs; petiolar gland 1, stalked; stamens 5 .....1. *C. pumila*

Erect undershrubs or shurbs petiolar gland 1,stalked are sessile; stamens 1Ø usually 7 perfect and 3 staminodes:

Petiolar gland 1:

Petiolar gland just above the thickened base of petiole, globose ovoid, dark purple; pods flat, 8-12cm long; seeds in single row .....2. *C. occidentalis*

Petiolar gland 1-1.5 cm above the thickened base of petiole, linear-clavate, purple green; pods terete, 6 - 8 cm long; seeds in double rows .....3. *C. sophera*

Petiolar gland none:

Subulate glands between the lowest pair of leaflets; pods subterete, 1Ø - 12 cm long; seeds in a single row .....4. *C. tora*

1. **Cassia pumila** Lamk. Encycl. 1:651, 1785; FBI. 2:266, 1878; FUGP. 1:271, Repr. ed. 196Ø; HFDD. 177, 1977.

An annual prostrate or procumbent herb, young branches clothed with curled hairs. **Leaves** peripinnate; leaflets 6-25 pairs, linear-oblong, mucronate; petiolar gland 1, stipitate. **Flowers** solitary or 1-3 flower raceme. **Sepals** narrow lanceolate, hairy outside. **Petals** bright yellow. **Stamens** 5, filaments equalling anthers. **Ovary** densely villous. **Pod** flat, thinly pubescent. **Seeds** sub rhomboid, light brown.

Common in shady situations.

Flowering & Fruiting: August-November.

Siddiqui 31466, Gulamau.

2. **Cassia occidentalis** Linn. Sp. Pl. 377, 1753; FBI. 2:262, 1876; FUGP. 1:269, Repr. ed. 196Ø; HFDD. 177, 1977.

A large herb or under-shrub. **Stem** woody at the base. **Leaflets** 3-6 pairs, ovate-oblong, light green, petiolar gland placed just above the thickened base of petiole, globose-ovate, dark-purple. **Flowers** in 3-4 flowered axillary and terminal racemes. **Stamens** 1Ø, 6 perfect, others staminodes. **Pods** 8-12 cm long, flattened, slightly falcate, septate between the seeds. **Seeds** flattist-circular, pale-brown polished.

Common on fruit orchards.

Flowering & Fruiting: July-November.

Siddiqui 31411, Raro.

3. Cassia sophera Linn. Sp. Pl. 379, 1753; FBI. 2:262 [incl. var. *purpurea* (Roxb.) Baker.], 1878; FUGP. 1:269, Repr. ed. 1960; HFDD. 178, 1977.

Senna esculenta Roxb. F. Ind. 2:346, 1832.

A small shrub, **Leaflets** 4-10 pairs, oblong-lanceolate, petiolar gland located above the thickened base of petiole,linear-clavate. **Flowers** in 4-8 flowered axillary and terminal racemes. **Stamens** 10, 6-7 perfect. **Pods** terete, 30-40 seeds in double row. **Seeds** compressed flattish-rhomboid, polished.

Often found among hedges in cultivated fields and fruit orchards.

Flowering & Fruiting: August-December.

Siddiqui 31425, Bhulbhuliya.

4. Cassia tora Linn. Sp. Pl. 376, 1753; FBI, 2:263, 1878; proparte; Santapau in. Rec. Bot. Surv. Ind. 16(1):79, 1967; HFDD. 178, 1977.

Cassia obtusifolia Linn. Sp. Pl. 377, 1753; FUGP. 1:270, Repr. ed. 1960.

Erecet foited annual herb. **Leaves** imparipinnate, glands between two lower pairs, gland yellow linear and leaning towards the end of rachis. **Leaflets** 2-3 pairs, lower smaller, upper bigger, obovate, obtuse, nearly sessile. **Flowers** 5-8 in a receme, pedicellate, yellow. **Pod** straight, slightly curved.

Abundant, common in waste lands, road sides &edges of the fields.

Ethnobotanical uses:

Seeds and leaves are used in skin diseases. Decoction of the leaves is given to the children as suffered from feverish attacts while teething and fried with the castor oil used in foul ulcers.

Flowering & Fruiting: July-November.

Local Name: 'Panwar'

Siddiqui 31432, Baragaon.

2. **Caesalpinia** Linn.

Caesalpinia crista Linn. Sp. Pl. 380, 1753, pro major parte (excl. Fl. Zeyl. 157) Fl. Delhi 144, 1963; FPP. 71, 1978.

Ceasalpinia bonduc (Linn.) Roxb. Fl. Ind. 2:362, 1832, emend. Dandy. & Excell. in. Journ. Bot. 76:176-180, 1938.

Guilandina bonduc Linn. Sp. Pl. 381, 1753, pro parte.

Guilandina bonducella Linn. Sp. Pl. 545, 1762.

Caesalpinia bonducella (Linn.) Fleming in. As. Res. 9:159, 1810; Ind. Tr. 246, Repr. ed. 1971; FBI. 2:245, 1878; FUGP. 1:278, Repr. ed. 1960.

An extensive rambler, prickly; inflorescence and young parts rusty tomentose. **Leaves** 2-pinnate; Pinnae 5-10 pairs; **Leaflets** 12-24, downy beneath. **Flowers** yellow in axillary racemes. **Calyx** 5-lobed, rusty tomentose. **Petals** 5, yellow. **Stamens** 10. **Pod** oblong-orbicular, flat, covered with wiry spines, 2-seeded.

Commonly found near villages.

Flowering & Fruiting: August-December.

Siddiqui 31446, Kahoura.

The following species are often cultivated within the area.

1. **Bauhania variegata** Linn. Sp. Pl. 375, 1753; FBI. 2:284, 1878; Blatt. & Mill. Beaut. Ind. Tr. 3. t. 1. 1937; de Wit. in. Reinwardtia 3(4):411, 1956; FUGP. 1:277 Repr. ed. 1960; Ind. Tr. 258, Repr. ed. 1971; FPP. 70, 1978.

A medium sized tree. Leaves deeply lobed, broadly cordate, 11-15 nerved. Flowers in short axillary corymbs, odd petal red, others white with pink veins, fragrant.

Common, planted for the sake of beautiful flowers and the buds.

Ethnobotanical uses:

The bark is alterative, tonic, blood purifier, anthelmintic and astringent. Its decoction is given in scrofula, ulcers, syphilis, leprosy and other skin diseases.

Flowering & Fruiting: February-June.

Local Name: 'Kachnar'

Siddiqui 31923, Sanjay Gandhi road.

2. **Bauhania purpurea** Linn. Sp. Pl. 375, 1753; FBI. 2:284, 1878; Blatt. & Mill. Beaut. Ind. Tr. 6, 1937; de Wit. in Reinwardtia 3(4):406, 1956; FUGP. 276, Repr. ed. 1960; Ind. Tr. 258, Repr. ed. 1971; FPP. 70, 1978.

A small tree. Leaves sub-orbicular, cleft nearly half way down from the apex. Flowers deep pink or white. Calyx tube cleft into two reflect segments.

Commonly planted in gardens and parks.

Flowering & Fruiting: February-May.

Siddiqui 31982, Shaheed Udhyan.

3. **Parkinsonia aculeata** Linn. Sp. Pl. 375, 1753; FBI. 2:260, 1878; FUGP. 1:280, Repr. ed. 1960; Ind. Tr. 249, Repr. ed. 1971; FPP. 74, 1978.

A large spiny straggling shrub. **Leaves** bipinnate, the primary rachis reduced to sharp woody spines which have 2-6 pinnae congested in their axils; **Leaflets** very small, distichous, numerous, the leaflets of each pair often remain appressed to each other. **Flowers** yellow in axillary racemes; odd petal blotched with red. **Pods** elongated, striate glabrous.

Common extensively planted on road sides.

Flowering & Fruiting: October-June.

Siddiqui 31966, Tara Academy.

4. **Tamarindus indica** Sp. Pl. 34, 1753; FBI; 2:73, 1878; FUGP. 1:277, Repr. ed. 1960; FPP. 75, 1978.

A large handsome tree. **Bark** dark grey, longitudinally fissured. **Leaves** peripinnate. **Leaflets** 10-20 pairs, acidic, linear-oblong, emarginate. **Flowers** pale-yellow in lax terminal racemes. **Petals** 5, 3 large, 2 rudimentary. **Stamens** 3. **Pods** oblong, linear or curved, septate between the seeds, fibrous. **Seeds** hard, shining, dark brown.

Common. Planted for sheds and fruits.

Ethnobotanical uses:

Leaves are used as an anthelmintic, it is also in jaundice,

inflammatory swelling of ankles and joints, sprains, boils, sore eyes, scabies, wounds and ulcers. The pulp of the fruit is anti-scorbutic, digestive, carminative, laxative, astringent and anti-septic.

Flowering & Fruiting: April-December.

Local Name: 'Imli'

Siddiqui 31912, Sitapur road.

5. **Cassia fistula** Linn. Sp. Pl. 377, 1753; FBI. 2:261, 1878; FUGP. 1:268, Repr. ed. 1960; Blatt. & Mill. Beaut. Ind. Tr. 20. t. 4, 1937; Ind. Tr. 253, Repr. ed. 1971; FPP. 72, 1978.

A medium sized tree. **Bark** grey. **Leaflets** 4-8 pairs, ovate, accute, glabrous when matured. **Flowers** large, sulfur-yellow in drooping lax racemes. **Pedicel** long. The gynoecium protruding out of the flower. **Pods** dark-brown, solid, cylindric, filled with brown, gummy substances.

Common, cultivated in parks, gardens and on road sides.

Ethnobotanical uses:

Leaves juice and paste is usefull dressing for ringworm Decoction of the seeds is used in diabetes.

Flowering & Fruiting: March-August.

Local Name: 'Amaltas'

Siddiqui 31924, Sanjay Gandhi road.

6. **Cassia siamea** Lamk. Encycl. 1:648, 1985; FBI. 2:264, 1878; Ind. Tr. 254, Repr. ed. 1971; FPP. 73, 1978.

Cassia florida Vahl Bedd. Fl. Sylv. t. 179.

A medium sized tree. Differs from *C. fistula* in having elliptic oblong leaves, which are sharply mucrinate and flat pod, thickened at the sutures.

Planted at some places in private gardens.

Flowering & Fruiting: August-May.
Siddiqui 31974, Shaheed Udhyan.

7. **Cassia nodosa** Buch. -Ham. ex Roxb. Hort. Beng. 31, 1814, nom. nud. & Fl. Ind. 2:236, 1832; FBI. 2:261, 1878; Blatt. & Mill. Beaut. Ind. Tr. 28, 1937; Fl. Delhi 142, 1963.

Cassia nodosa Hailton Kurz. f. Fl. 1:392; Wight Ic. t. 410.

A large tree with spreading crown. **Leaflets** 5-12 pairs, elliptic oblong, acuminate. **Flowers** showy, pink, racemes from the scars of fallen leaves. **Pods** cylindrical long.

Planted in parks and private gardens.

Flowering & Fruiting: April-November.
Siddiqui 31973, Shaheed Udhyan.

8. **Delonix regia** (Boj. ex Hook) Raf. Fl. Tellur. 2:92, 1837; Sikdar & Gosh, Ind. Journ. For. 4(4):266, 1981.

Poinciana regia Boj. ex Hook in. Bot. Mag. t. 2884, 1829; FBI. 2:260, 1878; Blatt. & Mill. Beaut. Ind. Tr. 88. t. 25, 1937.

A medium sized with a large spreading umbrella shade crown. **Leaves** bipinnate. **Leaflets** oval-oblong. **Flowers** in large, branched racemes. **Petals** 5, odd petals yellowish-white with red

blotches, others orange red. **Stamens** 1Ø, filament hairy at the base, reddish in upper half. **Pods** flat with partitions between the seeds, 15-4Ø seeded.

Commom planted in garden and parks.

Flowering & Fruiting: March-February.

Siddiqui 31932, Chhatriya College.

9. **Caesalpinia pulcherrima** (Linn.) Swartz. Obs. Bot. 166, 1791; FBI. 2:55, 1878; T. A. Hattink in Reinwardtia g(1):5Ø, 1974; Ind. Tr. 247, Repr. ed. 1971; Sikdar & Gosh, Ind. Journ. For. 4(3):228, 1981.

Poinciana pulcherrima Linn. Sp. Pl. 38Ø, 1753.

A large erect shrub, spiny, spines curved; branches with lenticels. **Leaves** bipinnate; pinnae 5-9; leaflets 6-12. **Flowers** in erect large racemes, red, blotched with yellow. **Petals** 5. Clawed, odd petal smaller and unexpanded; the sepals facing it is boat shaped. **Stamens** 1Ø; filament filiform, red.

Cultivated in public parks and Government colonies.

Flowering & Fruiting: April-January.

Siddiqui 31994, Inspection House.

1Ø. **Peltophorum pterocarpum** (DC.) Baker ex K. Heyne, Nutt. Pl. Net. Ind. ed. 2. 2:755, 1927; Sikdar & Gosh, Ind. Journ. For. 4(4):269, 1981.

Inga pterocarpa DC. Prodr. 2:447, 1825.

Peltophorum ferrugineum (Decne) Benth. Fl. Aust. 2:279, 1884;

FBI. 2:257, 1876; Ind. Tr. 247, Repr. ed. 1971.

A large unarmed tree. **Leaves** bipinnate, dark green. **Flowers** large, shinning yellow in erect ferruginous racemes. **Petals** with ferruginous hairs on back. **Pods** flat, indehiscent, winged.

Planted in gardens and parks as an avenue tree.

Flowering & Fruiting: August-April.

Siddiqui 31972, Shaheed Udhyan.

XLI. MIMOSACEAE

Key to Genera:

Stamens definite;

Flowers in elongated spikes anther gland tipped .....1. *Prosopis*

Flowers in globose heads:

Pods jointed, transversely articulated, bristly .....2. *Mimosa*

Pods not jointed, opening through sutures, non bristly.....3. *Leucaena*

Stamens indefinite;

Filaments free; flowers in globose heads or spikes .....4. *Acacia*

Filament connate.

Pods straight .....5. *Albizzia*

Pods circinate, twisted .....6. *Pithecellobium*

1. **Prosopis** Linn.

Prosopis specigera Linn. Mant. 68, 1767; FBI. 2:288, 1878; FUGP. 1:284, Repr. ed. 1960.

Prosopis cineraria (Linn.) Druce in. Rep. Bot. Exch. Cl. Brit. Isles, 3: 422, 1914.

Mimosa cineraria Linn. Sp. Pl. 1500, 1763.

A small much spreading tree, 5-10 m high, armed with interfoliar,

compressed prickles. **Leaves** bipinnate; pinnae 1-2 pairs; leaflets 7-12 pairs, obliquely oblong. **Flowers** in axillary peduncled cylindric, 5-7.5 cm long spikes; cream-white. **Stamens** 10, free; anthers with a fugacious gland. **Pods** straight or slightly curved terete, 10-15 cm long, constricted between the seeds. **Seeds** 10-15, angular, oblong, flattened, embeded in mealy pulp.

Common in dry scrub forest and alkaline tracts.

Flowering & Fruiting: Almost all the year round.

Local Name: 'Vilayeti kikar'

Siddiqui 31377, Baturi.

2. **Mimosa** Linn.

Key to species:

Herbs; stamens 4 ..... 1. *M. pudica*

Shrubs or small trees; stamens 8;

Pinnae 3-5 pairs; pods with bristly sutures ..... 2. *M. hamata*

Pinnae 5 - 12 pairs; pods without bristly sutures ..... 3. *M. instia*

1. **Mimosa pudica** Linn. Sp. Pl. 518, 1753; FBI. 2:291, 1878; FUGP. 1:286, Repr. ed. 1960; HFDD. 179, 1977.

A subscandent herb or under shrub. **Leaves** bipinnate; pinnae 2 pairs, extremely sensitive to touch. **Flowers** in axillary peduncled, globose, polygamous, heads, 4-merous, light-pink. **Stamens** 4, free, exerted. **Pods** linear, constricted between the

seeds, bristly. Seeds elliptic-ovate, light brown.

Occassionally found near villages and cultivated as an ornamental.

Ethnobotanical uses:

The plant is used to cure piles, jaundice, leprosy and in kidney pain. Paste of the leaves is applied to hydrocoele and scabies.

Flowering: August-November; **Fruiting:** November-February.

Local Name: 'Chhui-mui'

Siddiqui 31447, Kahoura.

2. **Mimosa hamata** Willd. Sp. Pl. 4:1033, 1806; FBI. 2:291, 1878; FUGP. 1:287, Repr. ed. 1960; Fl. Delhi, 147, 1963.

An erect, diffuse or straggling shrub, prickly throughout. Leaves bipinnate, pinnae 3-6 pairs, leaflets 6-10 pairs, ovate oblong, obliquely rounded, acute or acuminate at apex. Flowers in dense globose peduncled heads, violet-pink or rosy-purple; bracts minute, bristly. Pods flat, curved, prickly at the edges and on the stalk, 4-8 jointed. Seeds elliptic-oblong, dark brown with a dark crescent in centre.

Straggling among hedges and trees in dry scrub forest.

Flowering: June-October; **Fruiting:** September-February.

Local Name: 'Kudaria'

Siddiqui 31358, Pokher.

3. **Mimosa intsia** Linn. Sp. Pl. 522, 1753; Sharma *et al*. Biol. Mem. 52, 1977; Sikdar & Gosh, Ind. Jour. For. 4(4):268, 1981.

Mimosa rubicaulis Lamk. Encycl. 1:20, 1783; FBI. 2:291, 1878; FUGP. 1:286, Repr. ed. 1960.

A large erect spineous shrub or small tree. **Stem** red. **Leaves** bipinnate, pinnae 5-12 pairs; leaflets 10-20 pairs, sharply bristled. **Flowers** in axillary peduncled head or in terminal panicles, pink, 4-merous. **Pods** 6-10, jointed, sutures smooth. **Seeds** similar to *Mimosa pudica*.

Common in dry scrub forest.

Flowering: July-October; **Fruiting:** September-February.

Siddiqui 31525, Saktapur.

3. **Leucaena** Benth.

Leucaena leucocephala (Lamk.) de Witt. in Taxon. 10; 53, 1961, FPP. 67, 1978.

Mimosa leucocephala Lamk. Encyl. 1:12, 1783.

Leucaena glauca Benth. in Hook. Jour. Bot. 4:416, 1842; FBI. 2:290, 1878; FUGP. 1:286, Repr. ed. 1960.

An erect small tree or large shrub, with smooth greyish-brown bark. **Leaves** bipinnate, pinnae 4-8 pairs, leaflets 10-20 pairs, linear-lanceolate rachis and young branches grey tomentose. **Flowers** in axillary peduncled, globose, neads or combined into terminal racemes, peduncles densely grey tomentose. **Sepals** 5, tubular-campanulate. **Petals** 5, greenish-white in colour. **Stamens** 10, free, twice the length of corolla; anthers versatile. Style smaller than the filaments. **Pods** flat, strap shaped, umbellete clusters with a small beak, mainy seeded.

Common with in the area.

Flowering: Late June-November; **Fruiting:** October-February.

Siddiqui 31376, Baturi purva

4. **Acacia** Mill.

Key to species:

Flowers in cylidrical spikes.

Patiole flattened into a phyllode; leaves caducous; pod much twisted unarmed tree .....1. *A. auriculiformis*

Patiole not flattened; pinnae 10-20 pairs, pod straight, flat armed tree .....2. *A. catechu*

Flowers in head.

Pod cylidric; seeds 2-seriate .....3. *A. farnesiana*

Pod moniliform; seeds 1-seriate .....4. *A. nilotica* Sub sp. *tomentosa*

1. **Acacia auriculiformis** A. Cunn. ex. Benth. in Hook. Lond. Jour. Bot. 1:377, 1842.

Acacia melanoxylon R. Br. Ind. Tr. 269 Repr. ed. 1971.

A medium sized to large tree, with drooping branchlets. Young branchlets flattened; phyllodes falcate. **Flowers** in axillary, cylindric spikes, bright-yellow, 5-merous. **Pods** spirally twisted, 5-10 seeded.

Cultivated in gardens and parks.

Flowering: September-November; **Fruiting:** February-April.

Siddiqui 31995, Inspection House.

2. **Acacia catechu** (Linn. f.) Willd. Sp. Pl. 4:1079, 1806; FBI. 2:295, 1878; FUGP. 1:290, Repr. ed. 1960; FPP. 64, 1978.

Mimosa catechu Linn. f. Suppl. 439. 1781.

A small much spreading tree. **Bark** rough, dark brown with longitudinal furrows, peeling off in narrow and long stripes. prickles not stipular, paired, compressed. Patiole often with scattered prickles. Pinnae 8-18 pairs. **Pod** thin, brown, shinning.

Often found near villages, also planted as ornamenatal.

Ethnobotanical uses:

Bark is used in chronic diarrhoea, dysentery, bleeding piles, uterine haemorrhage, leucorrhoea and gonorrhoea.

Flowering: May-November; **Fruiting:** October-February.

Local Name: 'Katha'

Siddiqui 31339, Etouli.

3. **Acacia farneciana** (Linn.) Willd. Sp. Pl. 4:1083, 1806, FBI. 2:292, 1878; FUGP. 1:288, Repr. ed. 1960; FPP. 1978.

Mimosa farneciana Linn. Sp. Pl. 52, 1753.

A small tree. **Bark** brown, smooth. **Leaves** bipinnate; pinnae 2-8 pairs, spines stipular, straight, whitish, nearly 1/4 to 1/2 the length of pinnae. **Flowers** bright yellow, fragrent. **Pods** cylindric. **Seeds** in two rows.

Occassionally found near the villages and roads.

Flowering & Fruiting: November-June.

Siddiqui 31574, Chak.

4. **Acacia nilotica** (Linn.) Del, Sub. sp. *tomentosa* (Benth.) Brenan in. kew Bull. 12:84, 1957; FPP. 65, 1978.

Acacia nilotica (Linn.) Del. var. *tomentosa* (Benth.) Hill in Bot. Mus. Leafl. Harward Univ. 8:98, 1940.

Acacia arabica auct. (non Willd.); FBI. 2:293, 1878; FUGP. 1:288, Repr. ed. 1960; Ind. Tr. 264, 1971.

A large tree. **Bark** dark grey, rough with deep narrow longitudinal fissures. Spines stipular, nearly equalling or slightly shorter than the pinnae. **Pinnae** 4-12 pairs; leaflets 10-35 pairs. **Flowers** yellow in axillary, globose, peduncled heads often forming a panicle. **Pods** moniliform. **Seeds** elliptic-ovate, compressed.

Common in the area.

Ethnobotanical uses:

Bark decoction is given in diarrhoea, dysentery, diabetes, genorrhoea, leucorrhoea, vaginal discharges and prolapse of uterus. The juice of the bark is applied as a syptic; it is particularly used for stopping bleeding from circumcision wounds. The gum is an emollient and demulcent. It is particulry used in diarrohea, dysentery and diabetes.

Flowering & Fruiting: August-May.

Local Name: 'Babool'

Siddiqui 31246, Bhulbhuliya.

5. **Albizzia** Durazz.

Key to species:

Pods straw coloured; Flowers stalked.....1. *A. lebbeck*

Pods dark brown; Flowers sessile .....2. *A. procera*

1. **Albizzia lebbeck** (Linn.) Benth. in Hook. Lond. Journ. Bot. 3:87, 1844; FBI. 2:298, 1878; FUGP. 1:295, Repr. ed. 1960; Ind. Tr. 271, Repr. ed. 1971.

Mimosa lebbeck Linn. Sp. Pl. 516, 1753.

A large decidous tree. **Bark** dark-grey or brownish and irregularly fissured. **Leaves** bipinnate, pinnae 2-5 pairs; leaflets 5-10 pairs, obliquely oblong, glabrous. **Flowers** pale-yellow in axillary or terminal globose peduncled heads. Scented. **Pods** strap like, 10-30 x 3.5 cm, straw-coloured with pale-brown patches over the seeds, dehescent. **Seeds** 6-12 brown.

Commonaly found within the area.

Ethnobotanical uses:

The bark is astringent, given in diarrhoea, dysentery and gonorrhoea. The flowers are used as an emollient on boils, eruptions, carbuncles and swellings. The leaf juice is applied to eye diseases and its decoction is given in night blindness.

Flowering: April-June; **Fruiting:** January-February.

Local Name: 'Siris'

Siddiqui 3130⌀9, Atwa.

Albizzia lebbeck Benth.

2. **Albizzia procera** (Roxb.) Benth. in Hook. Lond. Journ. Bot. 3:89, 1844; FBI. 2:299, 1878; FUGP. 1:296, Repr. ed. 1960; Ind. Tr. 271, Repr. ed. 1971.

Mimosa procera Roxb. Pl. Cor. 2:21, t. 121, 1799.

A tall tree, usually with straight trunk. **Bark** Yellowish or greenish-white, exfoliating into flakes. **Leaves** bipinnate, pinnae 2-8 pairs; leaflets 6-12 pairs, oblong-ovate. **Heads** 2-5 in large terminal panicles. **Flowers** sessile, yellowish-white. **Stamens** numerous, filament connate below. **Pods** strap shaped, reddish-brown, shinning, 8-12 seeded.

Common within the area.

Flowering: June-August; **Fruiting:** December-May.

Local Name: 'Safed sirsa'
Siddiqui 31341, Chhatouri.

6. **Pithecellobium** Mart., non. cons.

Pithecellobium dulce (Roxb.) Benth. in Hook. Journ. Bot. 3:199, 1844; FBI. 2:302, 1878; FUGP. 1:297, Repr. ed. 1960; FPP. 68, 1978.

Mimosa dulcis Roxb. Pl. Cor. 1:67, t. 99, 1789.

Inga dulcis Willd. Sp. Pl. 4:1005, 1806.

A medium sized tree, some times with shrubby habits. **Branches** pendant with short stipular spines. **Leaves** bipinnate; leaflets elliptic-ovate, obliquely-falcate. **Flowers** in globose heads forming long drooping, panicled racemes, yellowish-white. **Stamens**

40-50; filaments connate in lower part. **Pods** spirally twisted, 5-11 seeded. **Seeds** dark brown to black, arillate, flat, polished, embedded in spongy pulp.

Commonally found within the area, pods are very fondly eaten by the children as the pulp is sweet.

Flowering: November-January; **Fruiting:** April-June.

Local Name: 'Jungle jalebi'

Siddiqui 31573, Chak.

XLII. ROSACEAE

Key to Genera:

Erect or climbing shrubs.

Petals usually several; thorns curved.....1. *Rosa*

Petals five.

Leaves and inflorescence usually glabrous.

Fruits minutely hirsute, with single lateral furrow running from apex to base; stone single with minute holes and sharp edges .....2. *Prunus*

Fruits quite glabrous, gland dotted, pyriform, no furrow; seeds more than two, small and smooth .....3. *Pyrus*

Leaves (abaxially) and inflorescence densely tomentose; fruit ovate obovoid, skin thin, yellow to orange; stone often 1, rarely two, smooth, dark-brown .....4. *Eriobotrya*

Prostrate herbs; leaves compound, flowers small and yellow .....5. *Potentilla*

1. **Rosa** Linn.

Several varieties of roses belonging to various species *e.g. Rosa multiflora* Thunb. and *Rosa banksiae* R. Br. are grown in gardens.

2. **Prunus** Linn.

Prunus persica (Linn.) Stokes in Bot. Mag., Med. 3:100, 1812; FBI. 2:313, 1878; FUGP. 1:298, Repr. ed. 1960; FPP. 105, 1978.

Amygdalus persica Linn. Sp. Pl. 472, 1753.

Extensively grown for the sake of fruits, locally called as 'Aaroo'.

Flowering & Fruiting: March-June.

Siddiqui 31909, S.P. Lodge.

3. **Pyrus** Linn.

Pyrus pyrifolia Nakai var. *culta* Nakai in Bot. Mag. Tokyo 40:564, 1926; FL. Delhi 153, 1963.

Pyrus sinesis Hort. (non Linn.)

A common fruit. Fruits are locally known as 'Nashpati'.

Flowering & Fruiting: April-October.

Siddiqui 31971, Shaheed Udhyan.

4. **Eriobotrya** Lindl.

Eriobotrya japonica (Thunb.) Lindl. in Trans. Linn. Soc. 13:102, 1822; FBI. 2:372, 1878; FUGP. 1:303, Repr. ed. 1960; Fl. Delhi 153, 1963.

Mespilus japonica Thunb. Fl. Japan 260, 1784.

Seldom grown in gardens for the sake of fruits locally called as 'Loquat'.

Flowering & Fruiting: Summer season.

Siddiqui 31945, Collectrate.

5. **Potentilla** Linn.

Potentilla supina Linn. Sp. Pl. 497, 1753; FBI. 2:359, 1878; FUGP. 1:3Ø1, Repr. ed. 196Ø; HFDD. 171, 1977; FPP. 1Ø4, 1978.

Annual prostrate herb. **Stem** branches many radiating from a central point tinged with very light red, hairy. **Leaves** 3-5 foliate; leaflets subsessile, opposite or alternate, obovate, oblong or cuneate, obtuse, lobulate or serrate, the base may be equal or unequal, stipules ovate, entire and hairy. **Flowers** on slender acillary pedicels, the pedicel elongates as the fruit matures. **Petals** oblong, smaller than the sepals, yellow. **Stamens** numerous, inserted on the calyx tubes; filaments short; anthers yellow. **Carpels** several, free, style subterminal.

Commonly found in grass-lands, in dry ponds and other shady and moisty localities.

Flowering: January-March; **Fruiting:** February-April.

Siddiqui 31212, Khera.

XLIII. COMBRETACEAE

Key to Genera:

Trees; corolla absent .....*1. Terminalia*

Scandent shrubs or climbers; corolla present.....*2. Quisqualis*

1. **Terminalia** Linn., nom. cons.

Key to species:

Fruits drupaceous ovoid, without wings.

Flowers:

Greenish-yellow .....1. *T. bellirica*

Dull-white .....2. *T. chebula*

Fruits coriaceous, distinctly winged.

Flowers:

Pale-yellow .....3. *T. arjuna*

Dull-yellow .....4. *T. tomentosa*

1. **Terminalia bellirica** (Gaertn.) Roxb. Pl. Cor. 2:54. t. 198, 1805; FBI. 2:445, 1878; FUGP. 1:308, Repr. ed. 1960; Fl. Delhi 155, 1963; FPP. 107, 1978.

Myrobalanus bellirica Gaertn. Fruct. 2:90. t. 97, 1970.

A large deciduous tree. **Bark** dark-grey, exfoliating into small flakes. **Leaves** simple alternate, crown at the ends of branches, broadly elliptic, coriaceous, long petioled. **Flowers** greenish-yellow, offensive, in drooping axillary lax spikes, apical flowers unisexual (staminate) with rudimentry pistil. **Calyx** tube

5-lobed, villous. **Petals** none. **Stamens** 10, unequal; anthers 2-celled, dorsifixed. **Disk** densely villous, red tinged. **Ovary** 1-celled, globose, rusty tomentose; style 1, simple. **Fruit** obscurely 5-angled, pyriform, grey tomentose, drupe.

Commonly found within the area, often cultivated along road sides.

Ethnobotanical uses:

The pulp of the fruit is astringent, laxative and mixed with common salt and clove, used in throat and chest pain. Dry fruit is used in piles, diarrhoea and fever.

Flowering : April-June; **Fruiting:** August-February.

Local Name: 'Bahera'

Siddiqui 31385, Lakhimpur Road.

2. **Terminalia chebula** Retz. Obs. 3:31, 1798; FBI. 2:446, 1878; FUGP. 1:309, Repr. ed. 1960; FPP. 107, 1978.

A medium sized deciduous tree. **Bark** thick, dark-brown. **Leaves** simple, sub-opposite, ovate-oblong, acute, short petioled; petiole with 2-glands near its apex, tomentose when young. **Flowers** dull-white in terminal or subterminal panicle spikes. **Fruits** ellipsoid, 5-ribbed drupe, blakish-brown.

Often found near villages.

Ethnobotanical uses:

Fruits are used in piles, chronic diarrhoea, dysentery, asthma, urinary disorders, vomiting, intestinal worms, enlarged spleen and liver etc. A fine powder of the fruit is used as a dust over

ulcers and wounds. Bark is used a cardiac tonic.

Flowering : April-June; Fruiting: Cold season (next year).

Local Name: 'Harra'

Siddiqui 31386, Lakhimpur Road.

3. Terminalia arjuna (Roxb. ex DC.) Wt. & Arn. Prodr. 314, 1834; Bedd. Fl. Sylv. t. 28, 1869; FBI. 2:447, 1878; Fl. Delhi 156, 1963; FPP. 107, 1978.

Pentaptera arjuna Roxb. Hort. Beng. 34, 1814, nom. nud.; DC. Prodr. 3:14, 1828. Cum. descript.

Pentaptera glabra Roxb. Hort. Beng. 34, 1814, nom. nud. & Fl. Ind. 2:440, 1832.

Terminalia glabra (Roxb.) Wt. & Arn. Prodr. 314, 1834; FUGP. 1:309, Repr. ed. 1960.

A medium sized or large handsome. glabrous tree. **Bark** light-grey, smooth, peeling off in thin flakes. **Leaves** ovate-lanceolate cordate at the base, two or sometimes one gland present near the base of leaf. **Flowers** greenish-yellow, terminal and axillary spikes, bract linear. **Calyx** tube longer than the bracts, 5-lobed, with an orange disk at the throat of the tube, hairy. **Petals** none. **Stamens** 10, subequal, exserted. **Fruit** resembling that of carambola, 5-winged, coriaceous, dark-brown fibrous.

Planted on road sides.

Ethnobotanical uses:

Bark is used in heart diseases; as cardiac tonic and its decoction given in diarrhoea, dysentery and haemorrhage.

Flowering : May-April; **Fruiting:** June-July.

Local Name: 'Arjun'

Siddiqui 31334, Hardoi.

4. Terminalia tomentosa Wt. & Arn. Prodr. 314, 1834; FBI. 2:447, 1878; FUGP. 1:337, Repr. ed. 1960; Fl. Delhi 156, 1963; Ind. Tr. 310, Repr. ed. 1971.

A medium sized or large deciduous tree. **Bark** black, deeply furrowed. Young parts rusty tomentose. **Leaves** sub-opposite, oblong-ovate, entire emarginate, coriaceous. **Flowers** dull-yellow in panicle, lax spikes. **Fruits** 5-winged; wings transversely striated, crenulate.

Commonly found within the area.

Ethnobotanical uses:

bark is used in gonorrhoea, leucorrhoea, diarrhoea, dysentery, heart diseases, ulcers and haemorrhage, its decoction in retention of urine, spitting of blood from the chest.

Flowering : April-July; **Fruiting:** February-March.

Local Name: 'Asna'

Siddiqui 31941, Hardoi.

2. Quisqualis Linn.

Quisqualis indica Linn. Sp. Pl. 556, 1753; Man. Cult. Pl. 724, 1959; Bor. & Raizada, 178, Pl. 66, 1954; FUGP. 1:313, Repr. ed. 1960; Fl. Delhi 157, 1963; FPP. 106, 1978.

A large climber, stem yellowish-brown. **Leaves** subsessile,

opposite, superposed. **Flowers** in terminal pendulous large corymbs, sessile, initially white then turning pink-red, emitting sweet gragrance at night. **Calyx** tube long, 5-lobed, reflexed. **Petals** attached at the mouth of calyx tube. **Stamens** filament long, inserted on unequal heights.

Commonly planted in private gardens and lawns.

Flowering: April-November; **Fruiting:** Not observed.

Siddiqui 31946, Collectrate.

XLIV. MYRTACEAE

Key to Genera:

Fruit a berry.

Berry with numerous seeds; yellow or greenish-yellow when ripe; persistent calyx bifid ..... 1. *Psidium*

Berry single-seeded; purple coloured.

calyx cupular, gland dotted ..... 2. *Syzygium*

Calyx campanulate, concave ..... 3. *Cleistocalyx*

Fruit a capsule.

Leaves puberulous atleast abaxially; flowers sessile in pendullous cylindrical spikes; filament brightly coloured ..... 4. *Callistemon*

Leaves glabrous; flowers pedicelled, in dichotomous axillary or terminal cymes; filament colourless ..... 5. *Eucalyptus*

1. **Psidium** Linn.

Psidium guajava Linn. Sp. Pl. 470, 1753; FBI. 2:468, 1878; FPP. 109, 1978.

Psidium pyriferum Linn. Sp. Pl. (ed. 2) 672, 1762.

A small tree, stem single or sometimes many from near the base. **Bark** pale-brown, smooth, exfoliating in thin flakes. **Branches** 4-angled when young, later nearly terete. **Leaves** elliptic-oblong,

close set, obtuse, entire, lateral nerves running parallel to each other. **Flowers** on 1-3 flowered axillary peduncles. **Petals** white. **Stamens** numerous; filaments filiform. **Fruit** globose or pyriform, smooth or with uneven surface; pulp white or pink-red depending on the variety.

Commonly cultivated in house and orchards.'

Ethnobotanical uses:

Decoction of leaves are used in cough and fever. The bark is astringent and recommended as a remedy for the chronic diarrhoea of children. Pounded leaves are applied in rheumatism.

Flowering : May-June; September-October; **Fruiting:** August-September; December-January.

Local Name: 'Amrood'

Siddiqui 31940, Hardoi.

2. **Syzygium** Gaertn., nom. cons.

Syzygium cumini (Linn.) Skeels in US. Depart. Agric. Bur. Pl. Ind. Bull. n. 248; 2, 1912.

Myrtus cumini Linn. Sp. Pl. 471, 1753.

Eugenia jambolana Lamk. Encycl. 3:198, 1789; FBI. 2:499, 1879; FUGP. 1:315, Repr. ed. 1960.

Syzygium jambolana DC. Prodr. 3:259, 1828.

A medium sized tree. **Bark** light-grey to brown. **Leaves** distant, broadly oval or obovate, petioled, upper surface shining. **Flowers** in trichotomous cymes, combined into pendulous panicles. **Petals**

5, calyptrate, creamy-white. **Stamens** numerous; anthers gland tipped. **Fruit** usually an ellipsoid berry, deep-purple to black when ripe, single seeded.

Mostly planted on road sides.

Ethnobotanical uses:

Bark is astringent; its juice is given in diarrhoea, dysentery and menorrhagia. Bark decoction is used to mouth wash and gargle for treating spongy gums. Powder of seeds are used in diabetes, diarrhoea and dysentery.

Flowering : Late April-May; **Fruiting:** Mid June-July.

Local Name: 'Jamun'

Siddiqui 31963, Homoepathic Hospital.

3. Cleistocalyx Blume

Cleistocalyx operculatus (Roxb.) Merr. & Perry in Journ. Arn. Arb. 18:337, 1937.

Eugenia operculata Roxb. Hort. Beng. 1814, nom. nud. & FBI. 2:498, 1878; FUGP. 1:314, Repr. ed. 1960.

A moderate sized evergreen tree with thick grey bark. **Leaves** elliptic or ovate, obtusely acuminate, coriaceous, glabrous, dull-green; lateral nerves 8-12 pairs, distant. **Flowers** 4-merous, small, greenish-white in terminal or axillary trichotomous cymes or panicles. **Calyx** campanulate, 4-lobed, lobes truncate. **Petals** calyptrate, suborbicular, concave. **Stamens** many, free, folded; filaments filiform, anthers versatile, each with a deciduous apical gland. **Ovary** inferior. **Berry** dark-purple, juicy, edible,

globose or ovoid, one-seeded.

Planted on road sides.

Flowering: April-May; **Fruiting:** August-September.

Siddiqui 31351, Chandra Devi Shiksha Niketan.

4. **Callistomon** R. Br.

Callistomon citrinus (Curt.) Skeels (1913); Backer & Bakh. f. Fl. java 3:646, 1968; Suppl. FUGP. 72, 1976.

Metrosideros citrinus Curt. Bot. Mag. t. 260, 1794.

Callistemon lanceolatus DC. Prodr. 3:233, 1828.

A small tree with fissured bark and drooping branches. **Leaves** shortly petioled, coriaceous, puberulous atleast abaxially, entire, sharply pointed at apex; lateral nerves obscure. **Flowers** in compact, cylindrical and drooping spikes. **Calyx** tube campanulate, gland dotted. **Stamens** numerous, exserted; filaments quite long, red, shortly connate at base. **Fruits** sessile, globose, capsule. **Seeds** numerous, light-brown.

Planted in gardens and parks.

Flowering: February-March; **Fruiting:** April-June.

Siddiqui 31910, S.P. Lodge.

5. **Eucalyptus** L'Herit

Key to species:

Flowers solitary or 2-3 fascicled, never combined into panicles .....1. *E. globulus*

Flowers in 3-flowered umbels, combined into panicles .....2. *E. citriodora*

1. **Eucalyptus globulus** Labill. Rel. Voy. Recher. Per. 1:153, t. 13, 1799; Blakeley, Key Eucal. (ed. 2) 161, 1955.

A tall tree. **Bark** smooth peeling off in long stripes or sheaths during growth period, ashy-grey. **Leaves** opposite, sessile, lanceolate, subcoriaceous, fulcate. **Flowers** axillary 1-3 in a group. **Calyx** tube warty, studded with oil glands. **Petals** double connate, calyptrate, caducous, warty. **Stamens** many. **Ovary** inferior. **Fruit** turbinate.

Cultivated in parks and gardens and also on road sides.
Flowering: November-February; **Fruiting:** April-May.
Siddiqui 31911, Hardoi.

2. **Eucalyptus citriodora** Hook in Mitch. Journ. Trop. Aust. 235, 1848; Fl. Delhi 159, 1963; Suppl. FUGP. 73, 1976.

A tall tree, 20-40 m high. **Bark** smooth grey, exfoliating annually in long flakes. **Flowers** in 3-flowered umbels, combined into short panicles. **Petals** connate, double, calyptrate; inner one semiorbicular, transluscent, with radial faint streaks, apex often pointed. **Fruit** a globose-urceolate capsule.

Often planted as an avenue tree.
Ethnobotanical uses:
Eucalyptus species have a lot of medicinal utilities; its oil locally called 'Eucalyptus oil' available in the market, many allopathic drugs derived from the oil.
Flowering : November-January; **Fruiting:** March-April.
Local Name: 'Eucalyptus'
Siddiqui 31983, Shaheed Udhyan.

XLV. LYTHRACEAE

Key to Genera:

Shrubs or trees, calyx herbaceous.

Flowers irregular; calyx tube slightly curved ..... 1. *Woodfordia*

Flowers regular; calyx tube straight.

Flowers 4-merous; stamens 8 ..... 2. *Lawsonia*

Flowers 6-merous; stamens indefinite ..... 3. *Lagerstroemia*

Herbs, usually marshy or aquatic; calyx membraneous.

Fruit wall densely and finely cross-striate, fruits 2-5 valved ..... 4. *Rotala*

Fruit wall not finely cross-striate, fruits irregularly dehiscent or operculate ..... 5. *Ammannia*

1. **Woodfordia** Salisb.

Woodfordia fructicosa (Linn.) Kurz. in Journ. & Proc. Asiat. Soc. Beng. 40:56, 1871; Santapau in Rec. Bot. Surv. Ind. 16(1):114, 1953; FPP. 111, 1978.

Lythrum fructicosum Linn. Sp. Pl. 641, 1762.

Woodfordia floribunda Salisb. Parad. Lond. t. 42, 1806; FBI. 2:572, 1878; FUGP. 1:351, Repr. ed. 1960.

A large shrub with long, spreading branches. Bark reddish-brown,

peeling off in fibers. **Leaves** ovate-lanceolate, acuminate, entire, velvety beneath; puberulous above. **Flowers** in axillary clusters, on slender pedicels. **Calyx** scarlet, tubular, slightly curved, 6-lobed, lobes oblong. **Petals** 6, white, not exceeding the calyx lobes. **Stamens** 12, inserted at the base of calyx tube, exserted filaments red; anthers versatile. **Ovary** superior, 2-celled; ovules numerous. **Capsule** globose, included within the persistent calyx tube. **Seeds** many, brown, angular smooth.

Common in the forest within the area.

Ethnobotanical uses:

Flowers are given with curd in dysentery, haemorrhage, leucorrhoea, menorrhagia, piles and liver complaints; its decoction is applied over the ulcers and wounds.

Flowering: January-April; **Fruiting:** April-May.

Local Name: 'Deoti'

Siddiqui 31233, Kundouli.

2. **Lawsonia** Linn.

Lawsonia inermis Linn. Sp. Pl. 349, 1753; Rokhne in Bot. Jharb. 4:36, 1883; Santapau in Rec. Bot. Surv. Ind. 16(1):100, 1967; FPP. 111, 1978.

Lawsonia alba Lamk. Encycl. 3:106, 1789; FBI. 2:573, 1875; FUGP. 1:323, Repr. ed. 1960; Ind. Tr. 340, Repr. ed. 1971.

A large shrub, sometimes dwarf due to periodic trimming. **Branches** often ending into a spine. **Leaves** small, lanceolate, nearly sessile. Flowers fragrant, white in large terminal penicles.

Calyx 4-lobed. **Petals** 4, free. **Stamens** 8. **Capsule** globose enclosed in persistent calyx.

Often planted in houses for the sake of leaves, which are much valued by women to dye their palms and soles, also make a good hedge when properly trimmed.

Ethnobotanical uses:

Leaves paste are applied externally for headache and to sole and feet in small pox. Bark is given in jaundice and enlargement of spleen and also as an alterative in leprosy, skin diseases and burns. The leaf juice is mixed with sugar and used in spermatorrhoea.

Flowering: April-September; **Fruiting:** June-October.

Local Name: 'Mehndi'

Siddiqui 31939, Hardoi.

3. Lagerstroemia Linn.

Key to species:

Trees; levaes acute, with both halves equal calyx accrescent and becomes woody in the fruit .....1. *L. speciosa*

Shrubs; leaves obtuse, with both halves slightly unequal; calyx neither accrescent nor woody in the fruit .....2. *L. indica*

1. Lagerstroemia speciosa (Linn. ex Murray) Pers. Syn. Pl. 2:72, 1806; Koehne in Pfreich. 17:261, 1903; FPP. 110, 1978.

Muenchhausia speciosa Linn. ex Murray, Prodr. Strip. Gotting t.

2, 1770.

Lagerstroemia flosreginae Retz. Obs. Bot. 5:25, 1788; FBI. 2:577, 1878; FUGP. 1:325, Repr. ed. 1960; Ind. Tr. 339, Repr. ed. 1971.

A medium sized tree with smooth bark and dome-shaped crown. **Leaves** elliptic-oblong. **Flowers** in terminal panicles, pink-purple. **Calyx** tube short, 6-lobed; lobes reflexed. **Petals** 6, crispy. **Stamens** numerous. **Fruit** a woody capsule.

Planted on road sides and parks.

Flowering: june-August; **Fruiting:** October-November.

Siddiqui 31933, Chhatriya College.

2. **Lagerstroemia indica** Linn. Syst. 1076, 1759; FBI. 2:575, 1878; Wight Ic. t. 86, 1840; FUGP. 1:325, Repr. ed. 1960; Ind. Tr. 338, Repr. ed. 1951; FPP. 110, 1978.

A dark-green, attractive shrub. **Leaves** smaller than the *L. speciosa*, obtuse, glabrous, both the halves slightly unequal. **Flowers** in terminal panicles, white or pink. **Calyx** 6-lobed; lobes acute, erect. **Petals** long-clawed, margins shortly fimbriate. **Stamens** numerous; outer longer and incurved. **Style** bent, dgree of curvature variable. **Capsule** not woody.

Often planted in gardens and public parks.

Flowering: April-September; **Fruiting:** August-February.

Siddiqui 31970, Shaheed Udhyan.

4. **Rotala** Linn.

Rotala rotundifolia (Roxb.) Koehne, Bot. Jharb. 1:174, 1810;

Pfreich. 17:41, 1903; Blatt. & Hallb. Journ. Bomb. Nat. Hist. Soc. 25, 718, 1918; HFDD. 186, 1977.

Ammannia rotundifolia Roxb. Fl. Ind. ed. Carey & Wall. 1:446, 1820; FBI. 2:256, 1878; FUGP. 1:349, Repr. ed. 1960.

Erect or decumbent herb. **Stem** extensively creeping and rooting at nodes. **Leaves** sessile, arranged in terminal simple or panicled spikes, dimorphic as regards the length of stamens and style, solitary in the axils of leafy bracts. **Calyx** tube campanulate, 4-lobed. **Petals** 4, obovate, rose-coloured. **Capsule** 4-valved. **Seeds** brownish, yellow, ellipsoid.

Abundant in marshy, grassy localities and swampy rice fields.

Flowering & Fruiting: September-January.

Siddiqui 31467, Kahoura.

5. **Ammannia** Linn.

Key to species:

Flowers apetalous; subsessile axillary cymes .....1. *A. baccifera*

Flowers petaliferous, distinctly peduncled cymes .....2. *A. senegalensis*

1. **Ammannia baccifera** Linn. Sp. Pl. 1:120, 1753; FBI. 2:569, 1871; FUGP. 1:321, Repr. ed. 1960; Fl. Delhi 161, 1963; HFDD. 185, 1977; Graham in Journ. Arn. Arb. 66(4):405, 1985.

Erect, much branched, annual-perennial herb. **Leaves** sessile oblong, lanceolate-oblanceolate, acute or obtuse at the apex.

Flowers subsessile in axillary clusters. **Petals** none. **Fruits** a depressed, globose capsule.

Abundant in marshy places.

Ethnobotanical uses:

Leaves are used in blisters, rheumatism and fever.

Flowering : August-November; **Fruiting:** August-January.

Local Name: 'Karoti'

Siddiqui 31455, Charouli.

2. **Ammannia senegalensis** Lamk. Tabl. Encycl. 1:312. n. 155. t. 77. f. 2, 1791; FBI. 2:570, 1879; FUGP. 1:322, Repr. ed. 1960; Fl. Delhi 161, 1963.

Ammannia auriculata Willd. Hort. Berol. 1:7, t. 7, 1806; FPP. 110, 1978.

An erect annual herb, branching from above the base. **Leaves** sessile, broadened and auricled at the base, entire; secondary nerve not much prominent. **Flowers** in dichotomously branched axillary clusters, bracteate. **Calyx** campanulate with 6-8 green lines, against the observations of Duthie these lines are quite distinct in fruit as well. **Fruit** not more than 10 in an axils globose, red; exceeding the calyx.

Common in moist places along canal banks and wet agricultural fields.

Flowering: August-November; **Fruiting:** October-January.

Siddiqui 31459, Gulamau.

XLVI. PUNICACEAE

Punica Linn.

Punica granatum Linn. Sp. Pl. 472, 1753; FBI. 2:581, 1879; FUGP. 1:3-5, Repr. ed. 1960; Fl. Delhi 163, 1963; FPP. 112, 1978.

A much branched shrub or tree. **Bark** dark-grey. **Leaves** oblong-lanceolate, entire, glabrous. **Flowers** sessile, solitary or in clusters of 2-5. **Calyx** 6-9 lobed in upper part, lobes triangular, thick. **Petals** 6-9 free, crumpled, brick-red or orange. **Stamens** numerous. **Ovary** 6-12 celled, ovules numerous. **Fruit** globose berry, rind coriaceous. **Seeds** optusangular, outer layer juicy.

Cultivated as fruit tree in orchards and private gardens. Two distinct forms, one with red juice and other with white juice are met with.

Ethnobotanical uses:

Paste of the leaves is used in conjuctivitis and its juice; in dysentery. The bark of the stem and root is anthelmintic and used in leuchorrhoea, haemorrhages. The decoction of root bark is an efficacious in spleen enlargement. The flowers bud are used in diarrhoea, dysentery, leucorrhoea, blennorhoea and bronchitis.

Flowering: April-July; **Fruiting:** September-October.

Local name: 'Anar'

Siddiqui 31954, Bal Vidya Mandir.

XLVII. ONAGRACEAE

Key to Genera:

Herbs.

Flowers yellow; capsule cylinder.....*1. Ludwigia*

Flowers rosy-pink capsule 4-angled.....*2. Epilobium*

1. **Ludwigia** Linn.

Key to species:

Hydrophytes with white, spongy floats;

stamens 10 .....1. *L. adscendens*

Terrestrial or marshy herbs.

Glabrous, stamens 4 .....2. *L. perennis*

Villous, stamens 8 .....3. *L. octovalvis* var. *sassiliflora*

1. **Ludwigia adscendens** (Linn.) Hara, Journ.Jap. Bot. 28:290 1953; Raven, Reiwardtia 6:387, 1963; FPP. 112, 1978.

Jussiaea adscendens Linn. Mant. Pl. 1:69, 1767.

Jussiaea repens Linn. Sp. Pl. 1:388, 1753 (non *Ludwigia repens* Forst. 1771); FBI. 2:587, 1879; FUGP 1:326, Repr. ed. 1960.

A glabrous floating herb with white, spongy floats arising from the nodes. **Leaves** obovate entire, apex rounded, base narrowed into petiole. **Flowers** yellow, pedicelled **Petals** 5, obovate, white with yellowish viens. **Stamens** 10, in two whorls **Style** 1. **Stigma** capitate. **Capsule** cylindric, reflexed during ripening under water. **Seeds** reticulate.

Ludwigia adscendens (Linn.) Hara

Found in and edges of ponds and road side ditches.

Flowering: September-October; **Fruiting:** December-January.

Siddiqui 31Ø13, Tanskhera.

2. **Ludwigia perennis** Linn. Sp. Pl. 119, 1753; Raven, Reinwardtia 6:367, 1963; HFDD. 188, 1977.

Ludwigia parviflora Roxb. (Hort. Beng. 11, 1814; nom. nud.); Fl. Ind. ed. Carey & Wall. 1:44Ø, 182Ø; FBI. 2:588, 1879; FUGP. 1:327, Repr. ed. 196Ø.

Jussiaea perennis (Linn.) Brenan in Kew Bull. 163, 1953; Fl. Delhi 164, 1963.

A glabrous annual herb. Main Stem erect, branches decumbent or ascending. **Leaves** simple, linear-lanceolate, entire. **Flowers** small, yellow, **Sepals** 4, connate; Calyx lobes ovate. **Petals** 4, equal to the sepals, **Stamens** 4, Style 1. **Stigma** capitate. **Fruit** obtusely quadrangular, linear-oblong, crowned by persistent calyx lobes.

Often found in moist and shady places.

Flowering: August-September; **Fruiting:** October-November.

Siddiqui 31ØØ6, Near Hardoi railway-line.

3. **Ludwigia octovalvis** (Jacq.) Raven, Kew. Bull. 15:476, 1962; Subsp. *sessiliflora* (Mich.) Raven, Kew. Bull. 15:476, 1962; Reinwardtia, 6:362, 1963; HFDD. 188, 1977.

Oenothera octovalvis Jacq. Enum. Syst. Pl. 19, 176Ø.

Jussiaea suffruticosa Linn. Sp. Pl. 388, 1753; FBI. 2:587, 1869; FUGP. 1:327, Repr. ed. 196Ø.

An erect suffruticose, hairy herb. **Leaves** lanceolate, shortly petioled. **Flowers** solitary, axillary, yellow, subsessile. **Sepals** 4, connate, lobes enlarging in fruit. **Petals** 4, arbicular, pale-yellow. **Stamens** 8 (rarely few). **Fruit** a hairy, narrowly cylindric capsule, crowned with persistent sepals.

Abundant in agriculture fields.

Ethnobotanical uses:

Plant is used in dysentery and also as astringent and diuretic.

Flowering & Fruiting: October-February.

Local Name: 'Pani wali ghas'

Siddiqui 3114Ø, Manna Purwa, Pihani Road.

2. **Epilobium hirsutum** Linn. Sp. Pl. 347, 1753; DC. Prodr. 3:42, 1828; Clarke in HK. f. FBI. 2:583, 1879; Murty & Singh in Sci & Cult. 3Ø(3):15Ø, 1964; Suppl. FUGP. 75, 1976.

A much branched herb, upto 1 m high. **Stem** terete, hairy with both glandular and scattered hairs. **Leaves** opposite, sessile, semi-amplexicaul, softy pubescent. **Sepals** green, oblong, acute. **Petals** 4, rosy-pink. **Stigmas** 4, distinct, spreading. **Capsule** 4-angled, elongated.

Occasionally found with in the area from drying ditches.

Flowering & Fruiting: November-January.

Siddiqui 31ØØ8, Tanskhera.

XLVIII. TRAPACEAE

Trapa Linn.

Trapa natans Linn. var. bispinosa (Roxb.) Makino in In. Som. Dzus(ed. 3). 1:37, 1907; FPP. 113, 1978.

Trapa bispinosa Roxb. Pl. Cor. 234, 1815; FBI. 2:590, 1879; FUGP. 1:329, Repr. ed. 1960.

Annual, floating, hydrophytes. **Leaves** long petioled, dimorphic, submerged leaves, dissected while the floating one rhomboid-ovate, dendate in upper half; upper surface dark-green, glabrous; lower surface purple, pubescent. **Flowers** solitary, white, pedicels short, thick, spongy. **Sepals** 4, connate, 2-enlarged and spinescent in fruit. **Petals** 4, free, crenate on margins. **Stamens** 4. **Carpels** 2, connate. **Style** 1, filiform, **Stigma** capitate. **Fruits** a drup with 2 lateral sharp spines; pulp white, sweetish when young and tasteless when mature.

Commonly cultivated in ponds.

Flowering: August-September; **Fruiting:** October-December.

Local Name: 'Singhara'

Siddiqui 31127, Bilgram road.

XLIX. CUCURBITACEAE

Key to Genera:

Flowers white; fruit more than 3.5 cm across ..... *1. Coccinia*

Flowers yellow; fruit less than 1 cm across ..... *2. Mukia*

1. **Coccinia** Wt. & Arn.

Coccinia grandis (Linn.) Voigt, Hort. Suburb. Cal. 59, 1845; Meeuse, Bothalia 8:96, 1962; HFDD. 194, 1977.

Bryonia grandis Linn. Mant. Pl. 1:126, 1767.

Coccinia indica Wt. & Arn. Prodr. 347, 1834; FUGP. 1:354, Repr. ed. 1960.

Coccinia cordifolia auct. pl. (non *Bryonia cordifolia* Linn. 1753); Cogn. in DC. Monogr. Phan. 3:529, 1881; Chakraverty, Rec. Bot. Surv. Ind. 17:117, 1959.

Cephalandra indica Naud. Ann. Sci. Nat. Paris Ser. 5:16, 1869; FBI. 2:621, 1879.

A very extensively climber; young branches green, smooth, older rough. Rootstock woody. Levaes 5-angled or palmatifid, dark-green. Male flowers 1-3 in axils. Calyx tube obconical; lobes entire, recurved. Corolla white with greenish veins. Female flowers solitary. Fruit oblong, green with white spots when raw and beautifull red-scarlet when ripe.

Commonly found climbing on trees, bushes and electric poles.

Ethnobotanical uses:

Fresh fruits are eaten in case of diabetes. Powder of the fruit is also taken in case of diabetes.

Flowering & Fruting: march-December.

Local Name: 'Kundru'

Siddiqui 31003, Hardoi.

2. **Mukia** Arn.

Mukia maderaspatana (Linn.) M. Roem. Synop. Monogr. 2:47, 1846; HFDD. 201, 1977.

Cucumis maderaspatana Linn. Sp. Pl. 1012, 1753.

Bryonia scabrella Linn. f. Suppl. Pl. 424, 1781.

Mukia scabrella (Linn. f.) Arn. Journ. Bot. 276, 1841; FBI. 2:623 (excl. Syns.) 1879.

Melothria maderaspatana (Linn.) Cogn. in DC. Monogr. Phan. 3:623, 1881; Pfreich. 66:126, 1916; FUGP. 1:347, Repr. ed. 1960; Chakraverty, Rec. Bot. Ind. 17:141, 1959.

A small scabrid annual climbing herb. **Leaves** ovate to subdeltoid, 3-5 angled. **Male flowers** pedicilate, in clusters. **Sepals** 5, connate, villous, hirsud. **Petals** connate basally, hairy externally, yellow. **Stamens** 5; filaments short; anthers oblong, straight. **Female flowers** 2-3 fescicled, axillary, subsessile. **Ovary** 3-celled, globose, thinly pubescent; style short, surrounded by an annual disk. **Fruit** globose, red when ripe. **Seeds**

suborbicular, ovoid, ashy-grey.

Abundant among hedges and bushes.

Floweing & Fruiting: August-November.

Siddiqui 31157, Pihani Road.

The following plants are commonly cultivated for the sake of fruits.

1. **Lagenaria siceraria** (Molina) Standley, Pub. Field Mus. Nat. Hist. Bot. 3:435, 1930; HFDD. 199, 1977.

Cucurbita siceraria Molina Sagg. Stor. Nat. Chil. 133:335, 1782.

Cucurbita lagenaria Linn. Sp. Pl. 1010, 1753.

Lagenaria vulgaris Seringe, Mem. Soc. Phys. Hist. Nat. Geneva 3:25. t. 2. 1825; FBI. 2:613, 1879; FUGP. 1:335, Repr. ed. 1960.

Local Name: 'Louki'

2. **Luffa acutangula** (Linn.) Roxb. Hort. Beng. 70, 1814, nom. valid; Fl. Ind. ed. Carey 3:712, 1832; FBI. 2:615, 1879; FUGP. 1:337, Repr. ed. 1960; Chakroverty, Rec. Bot. Surv. Ind. 17:79, 1959.

Cucumis acutangula Linn. Sp. Pl. 1011, 1753.

Local Name: 'Arrotaroi'

3. **Luffa aegyptiaca** Mill. Gard. Dict. ed. 8. 500, 1768; FBI. 2:614, 1879; FUGP. 1:336, Repr. ed. 1960; Exell, Journ. Bot. 71:352, 1933; Backer & Bakh. f. Fl. Java 1:300, 1963; HFDD. 200, 1977.

Luffa cylidrica auct. pl. (non. M. Roem. 1846), Cogn. & Harms,

Pfreich. 88:62, 1924; Chakroverty, Rec. Bot. Surv. Ind. 17:75, 1959.

Local Name: 'Ghiyataroi'

4. **Momordica charantia** Linn. Sp. Pl. 1009, 1753; FBI. 2:616, 1879; FUGP. 1:339, Repr. ed. 1960; Chakroverty, Rec. Bot. Surv. Ind. 17:88, 1959; Fl. Delhi 169, 1963; HFDD. 201, 1977.

Local Name: 'Karela'

5. **Momordica dioica** Roxb. Roxb. ex Willd. Sp. Pl. 4:605, 1805; FBI. 2:617, 1879; FUGP. 1:339, Repr. ed. 1960.

Local Name: 'Ban-karela'

6. **Cucurbita maxima** Duch. in Lamk. Encycl. 2:151, 1786; FBI. 2:622, 1879; Bailey, Gen. Herb. 2:99, 1929; Chakroverty, Rec. Bot. Surv. Ind. 17:120, 1959; HFDD. 196. 1977; FPP. 116, 1978.

Local Name: 'Kumbhra' or 'Kaddu' or 'Sitaphal'

7. **Benincasa hispida** (Thunb.) Cogn. in DC. Monogr. Phan. 3:513, 1881; FUGP. 1:338, Repr. ed. 1960; Cogn. & Harms Pfreich. 88:275, 1924; Chakroverty, Rec. Bot. Surv. Ind. 17:84, 1959; HFDD. 193, 1977.

Cucurbita hispida Thunb. Fl. Japan 332, 1784.

Benincasa cerifera Savi, Biblioth. Ital. 9:158. t. c. 1818; FBI. 2:616, 1879.

Local Name: 'Khabaha' or 'Petha'

8. **Cucumis sativus** Linn. Sp. Pl. 1012, 1753; FBI. 2:62, 1879; Duthie & Fuller Op. Cit. 2:53, t. 51, 1882; Fl. Delhi 170, 1963;

Chakroverty, Rec. Bot. Surv. Ind. 17:105, 1969; HFDD. 196, 1977.

Local Name: 'Kheera'

9. **Cucumis melo** Linn. Sp. Pl. 1011, 1753; var. *melo*. FBI. 2:620, 1879; FPP. 117, 1978.

Local Name: 'Kharbooza'

10. **Cucumis melo** Linn. var. *utilissimus* (Roxb.) Duthie & Fuller, Field. Gard. Cr. 2:50, t. 49, 1882; FPP. 117, 1978.

Cucumis utilissimus Roxb. Hort. Beng. 70, 1814; nom. nud. & Fl. Ind. 3:721, 1832.

Local Name: 'Kakri'

11. **Cucumis melo** Linn. var. *momordica* Duthie & Fuller, Op. Cit. 2:50, t. 49, 1883.

Local Name: 'Phoot'

12. **Citrullus lanatus** (Thunb.) Matsumura et. Nakai in Cat. Sem. Hort. Bot. Univ. Tokyo 1920:38, 1920; Hara in Taxon 18:346, 1969; FPP. 114, 1978.

Momordica lanata THunb. Prodr. Fl. Cap. 13, 1794.

Cucurbita citrullus Linn. Sp. Pl. 1010, 1753.

Colosynthis citrullus (Linn.) O. Kuntze, Rev. Gen. Pl. 1:256, 1891; Chakroverty, Rec. Bot. Surv. Ind. 17:114, 1959.

Citrullus vulgaris Schard. in Eckl. & Zeyher. Enum. 279. 1836; Linnaea 12:412, 1838; FBI. 2:621, 1879; FUGP. 1:344, Repr. ed. 1960.

Local Name: 'Tarbooz'

13. **Citrullus vulgaris** Schard. var. *fistulossus* Duthie & Fuller, Op. Cit. 2:46, t. 47, 1883; FUGP. 1:344, Repr. ed. 1960.

Citrullus fistullossus Stock. in Hook. Kew Journ. 3:74, t. 3, 1851.

Local Name: 'Tinda'

14. **Trichosanthes dioica** Roxb. Fl. Ind. ed. Carey, 3:701, 1832; FBI. 2:609, 1869; FUGP. 1:334, Repr. ed. 1960; HFDD. 205, 1977.

Local Name: 'Parval'

15. **Trichosanthes anguina** Linn. Sp. Pl. 1008, 1753; FBI. 2:610, 1879; FUGP. 1:334, Repr. ed. 1960; HFDD. 204, 1977; FPP. 119, 1978.

Local Name: 'Chachenda'

L. CACTACEAE

Key to Genera:

Stem flat.

Flowers red, tubular, stamens exserted.....*1. Nopalea*

Flowers yellow, expanded, stamens not exserted .....*2. Opuntia*

1. **Nopalea** Salm-Dyck

Nopalea cochenillifera (Linn.) Salm-Dyck, Cact. Hort. Dyck. ed. 2. 64, 1850; Britton & Rose, *Cactaceae* ed. 3:1 & 2:33, 1963; HFDD. 207, 1977.

Cactus cochenillifera Linn. Sp. Pl. 468, 1753.

Branches ascending, phylloclades oblong; spines none. Leaves minute, caducous. Flowers borne in the upper part of the phylloclade, red, sessile. Stamens numerous, exserted, filament red.

Often cultivated in gardens.

Flowering: February-March.

Siddiqui 31916, Door Darshan Kendra.

2. **Opuntia** Tourn. ex Mill.

Key to species:

Spines pale-yellow, some curved .....1. *O. dillenii*

Spines yellowish-brown or black, all straight.

Spines 3-8; anthers apiculate; filaments

pink. Berry obvoid .....2. *O. elatior*

Spines 1-3; anthers not apiculate; filaments yellow. Berry pyriform .....3. *O. vulgaris*

1. **Opuntia dillenii** Haw. Pl. Succ. 79, 1812; FBI. 2:657, 1879; Burkill in Rec. Bot. Surv. Ind. 4(6):314, 1911.

A thorny bush, upto 2 m tall, with grey-green or bluish-green oblanceolate or obovate joints with undulate margins; lower joints often corky. Areoles with 4-6 horny or stout spines and numerous barbed bristle. Flowers sulfer-yellow slightly tinged with orange or red. Berry pyriform, depressed at the apex, bearing tufts of barked bristles, truncate, deep purple when ripe.

Native of South America. Naturalized in our area. Commonaly found on edges of scrub forest.

Flowering: March-May; **Fruiting:** July.

Local Name: 'Nagphani'

Siddiqui 31360, Bilgram Road.

2. **Opuntia elatior** Mill. Gard. Dict. (ed. 8) No. 4, 1768; Burkill Op. Cit. 313.

Opuntia elatior Mill. Gard. Dict. ed. 8, No. 4, 1768; HFDD. 207, 1977; FPP. 121, 1978.

Opuntia dillenii auct. pl. [non.(Ker-Gawler) Haw. 1819]; FUGP. 1:352, Repr. ed. 1960.

Opuntia nigricans Haw. Syn. Pl. Succ. 189, 1812.

A large shrub, lower portion of the stem more or less cylinderical, young stem jointed, phylloclades, obovate, fleshy, olive-green, flattened, areoles scattered, minutely tufted hairy, spines 1-8 per areoles, terete, acicular yellowish-brown. **Flowers** yellow when young later developing red blotches. **Fruits** a pyriform berry, red when ripe.

Often found in patches in waste places.

Ethnobotanical uses:

Hot paste of the leaves are used in rheumatism. Juice of the plant is given with sugar as purgative. The ripe fruit is demulcent and expectorant; it is given in gonorrhoea, asthma, bronchial catarrh and wooping cough.

Flowering: April-June; **Fruiting:** May-July.

Local Name: 'Nagphani'

Siddiqui 31388, Lakhimpur Road.

3. Opuntia vulgaris Mill. Gard. Dict. ed. 8, n. 1. 1768; HFDD. 207, 1977.

Opuntia monacantha Haw. Supp. Pl. Succ. 81, 1819; Burkill, Rec. Bot. Surv. Ind. 4:313, 1911.

Erect, widely branched shrub. **Stem** joints flat, phylloclades oblong-obovate, with areoles which contain 1-3 straight, brown tipped brickles; larger brickles 4-8 cm long. **Leaves** linear subulate, caducous 0.5-0.6 cm or absent. **Flowers** bright yellow. **Perianth** rotate; sepals ovate-subarbicular; greenish-yellow with a purple band. **Petals** yellow-oblong. **Stamens** as usual shorter

than petals. Style branches 5-6, white. Berry red, pyriform, aerolate, depressed at the apex, tardily dehescent.

Found rarely in the area along forest clearing and waste places.

Flowering: March-May; **Fruiting:** June-July.

Siddiqui 31394, Bhura tikku.

LI. PASSIFLORACEAE

Passiflora Linn.

Passiflora caerulae Linn. Sp. Pl. 959, 1753; Bailey in Man. Cult. Pl. 691, 1949; HFDD. 191, 1977.

A medium sized climber with dense foliage. **Leaves** palmatisect in 3-5 lobes; lobes minutely serrate; petiole with 2-4 glands. **Flowers** solitary axiallary, fragrant. **Sepals** 5, wide. **Petals** 5, bluish, rays of corona 2-4 serrate, purple at base, white in the middle and blue at the tip. **Stamens** 5, inserted on gynophore; anthers 2-lobed. **Ovary** 1-celled, 3-carpellary, placed on a gynophore. **Style** 3; Stigma capitate.

Planted in parks and private gardens.

Flowering: May-October; **Fruiting:** No fruit setting.

Siddiqui 31527, Tanskhera.

LII. CARICACEAE

Carica Linn.

Carica papaya Linn. Sp. Pl. 1036, 1753; FBI. 2:599, 1879; FUGP. 1:351, Repr. ed. 1960; HFDD. 191, 1977; FPP. 122, 1978.

Small laticiferous tree with mostly unbranched and straight stem; leaf scars prominent. **Leaves** in dense terminal crown, long petioled, petiole hollow; blade palmatisect into 7-9 pinnatifid segments. Staminate flowers in long drooping panicles; female subsessile in clusters of 2-3 or solitary. **Petals** 4-5 connate in male flowers, free or slightly connate in female flowers. **Stamens** 10, 2-seriate. **Ovary** ellipsoid-ovad, 1-celled with parietal placentation. **Fruit** a broadly ovoid, pyriform berry, green when young, yellowish-green on ripening; pulp orange, sweet. **Seeds** black, reticulately pitted.

Cultivated as commercial crop. Many varieties differing in plant height, fruit size and taste and number of seeds per fruit, are in cultivation.

Ethnobotanical uses:

The milky juice being an irritant is applied to swellings to prevent suppuration, to the mouth of the uterus to induce abortion and to corn, warts, pimples and other skin diseases. Poultice of leaves is applied for reducing elephantoid growth and foul wounds. The ripe fruit is alterative, stomachic, appetizing, digestive and anti-scorbutic; it is given in piles, enlargement

of liver and spleen and diarrhoea. Seeds are anthelmintic, emmena gogue and carminative.

Flowering: August-September; **Fruiting:** December-January.

Local Name: 'Papita'

Siddiqui 31938, Hardoi.

LIII. MOLLUGINACEAE

Key to Genera:

Carpels apocarpous; leaves linear .....*1. Gisekia*

Carpels syncarpous; leaves lanceolate:

Flowers axillary; seeds with a white filiform appendage .....*2. Glinus*

Flowers terminal; appendage none or minute .....*3. Mollugo*

1. **Gisekia** Linn.

Gisekia pharnaceoides Linn. Mant. 567, 1767; FBI. 2:664, 1879; FUGP. 1:356, Repr. ed. 1960; Fl. Delhi 173, 1963; FPP. 122, 1978.

A prostrate or ascending glabrous herb, upto 20 cm tall. **Branches** subflexuose. **Leaves** subopposite, linear, oblong, subsessile. **Flowers** small, yellowish in lax, terminal and axillary cymes. **Sepals** 5, free, margins scarious, tips reflexed. **Petals** 0. **Stamens** 5, free, filament dilated at base; anthers 2-celled, dorsifixed. **Carpels** 5, free, style short. **Fruit** of 5, free cocci, densely pillose, indehescent. **Seeds** dark brown or black, minutely reticulate.

Often found in sandy and dry soils.

Ethnobotanical uses:

Plants are anthelmintic and used to kill intestinal worms.

Flowering: July-September; **Fruiting:** September-November.

Local Name: 'Balu ka Saag'

Siddiqui 31479, Majhola.

2. **Glinus** Linn.

Key to species:

Plant densely stellate-hairy; flowers green in sublateral fascicles .....1. *G. lotoides*

Plant glabrous, flowers white slender pedicels .....2. *G. oppositifolius*

1. **Glinus lotoides** Linn. Sp. Pl.463, 1753; Baker, Fl. Males. Ser. 1. 4:269, 1951; Fl. Delhi 173, 1963; HFDD. 208, 1977.

Mullogo lotoides O. Kuntze, Rev. Gen. 264, 1891.

Mullogo hirta Thunb. Prodr. Fl. Cap. 24, 1794; FBI. 2:662, 1879; FUGP. 1:354, Repr. ed. 1960.

Holosteum hirsutum Linn. Sp. Pl. 88, 1753; Van Steenis, Blumea 13:167, 1965.

A prostrate or ascending, stellate hairy, annual herb. **Branches** radeating in all directions. **Leaves** ovate-obovate, stellately hairy on both surfaces. **Flowers** 3-5 in axillary clusters, subsessile. **Sepals** 5, densely stellate hairy. **Petals** Ø. **Stamens** 5, free; filament short initially, elongated later. **Ovary** glabrous, thin-walled, 5-celled; style 5. **Fruit** 5-valved capsule, included in persistant calyx. **Seeds** many reniform, tubercled, shinning, dark brown, with a long filiform appendage.

Commonaly found in dry ditches.

Flowering & Fruiting: March-September.

Siddiqui 31494, Sadai behta.

2. **Glinus oppositifolius** (Linn.) DC. in Bull. Herb. Boiss. 2. 1:559, 1901; Fl. Delhi 174, 1963.

Mullogo oppositifolia Linn. Sp. Pl. 89, 1753; FUGP. 1:355, Repr. ed. 1960.

Mullogo spergula Linn. Syst. 881, 1759; FBI. 2:662, 1879.

A trailing or diffused, much branched, glabrous herb. **Stem** leafy. **Leaves** 3-5 in whorls, oblong-ovate. **Flowers** in axillary clusters of 2-5, pedicel thin-walled, 3-5 celled; style 3-4 short. **Fruits** 3-4 valved loculicidal capsule, enclosed in persistant calyx. **Seeds** many appendage shorter than *Glinus lotoides* Linn.

Not common, found in moist or somewhat dry, sandy soils.

Ethnobotanical uses:

Juice of the leaves are used in earache, itches and other skin diseases.

Flowering: March-June; **Fruiting:** April-July.

Local Name: 'Jima'

Siddiqui 31389, Lakhimpur Road.

3. **Mullogo** Linn.

Key to species:

Leaves whorled at the nodes.....1. *M. pentaphylla*

Leaves radical only .....2. *M. nudicaulis*

1. **Mullogo pentaphylla** Linn. Sp. Pl. 89, 1753; FUGP. 1:355, Repr. ed. 1960; Baker, Fl. Males. Ser. 1. 4:268, 1951; HFDD. 209, 1977.

Mullogo stricta Linn. Sp. Pl. ed. 2. 131, 1762; FBI. 2:663, 1879.

Mullogo pentaphylla var. *stricta* (Linn.) Hochr. Candollea 2:356, 1925.

Simple or much branched, prostrate or erect or decumbent-ascending herb. **Leaves** opposite or in whorls of 3-5; lower ones petioled, obovate-spathulate, higher ones short petioled or subsessile, linear, lanceolate, acute or obtuse, single-nerved. **Flowers** greenish-white. **Perianth** lobes obovate-oblong, scarious margined. **Stamens** 3. **Style** 3. **Capsule** obtusely 3-gonous, many sseded. **Seeds** granulate; appendage minute.

Common in moist or dry situations and cultivated fields.

Flowering & Fruiting: March-December.

Siddiqui 31593, Asgaon.

2. **Mullogo nudicaulis** Lamk. Encycl. 4:234, 1797; FBI. 2:664, 1879; FUGP. 1:356, repr. ed. 1960; Fl. Delhi 174, 1963.

This species can be readily distinguished from the *Mullogo pentaphylla* by the presence of radical leaves.

Occasionally found in sugarcane fields.

Flowering & Fruiting: July-October.

Siddiqui 3150S, Kahoura.

LIV. AIZOACEAE

Key to Genera:

Ovary 2-celled; style 2 and fruit 2-valved.....*1. Zaleya*

Ovary 1-celled; style 1 and fruit 1-valved.....*2. Trianthema*

1. **Zaleya** Burm. f.

Zaleya pentandra (Linn.) Jeffrey, Kew Bull. 14:238, 1960; Stewart in Nasir & Ali, Fl. W. Pak. 235, 1972; Y. Nasir & Ali, Fl. W. Pak. 41:2, 1973; Sharma, Ind. Journ. For. 8(4):339, 1985.

Trianthema pentandra Linn. Mant. 1:70, 1767; Clarke in Hook. f. FBI. 2:660, 1879; Cook. Fl. Pres. Bomb. 1:590, 1958; FUGP. 1:354, Repr. ed. 1960.

Trianthema pentandra Linn. var. *rubra* Blatt. & Hallb. J. Bomb. Nat. Hist. Soc. 26:530, 1919 (Blatter & Hallberg, 6772 selected as lecto type by Santapau, BLATT).

Zaleya govindia (Buch. -Ham. ex G. Don) Nair, Bull. Bot. Surv. Ind. 8:86, 1966; Hedge & Lamond in Rec. f. Fl. Iran, 113:4, 1975; Sharma & Tyagi, Fl. N. E. Raj. 177, 1979.

Trianthema govindia Buch. -Ham. ex G. Don, Gen. Syst. 3:72, 1834; Melville, Kew Bull. 1952; 264, 1952; Fl. Delhi 175, 1963.

Zaleya govindia (Buch. -Ham. ex G. Don) Nair, var. *rubra* (Blatt. & Hallb.) Nair, Bull. Bot. Surv. Ind. 8:86, 1966; Rec. Bot. Surv. Ind. 21(1):124, 1978.

Zaleya redimita (Melville) Bhandari, Fl. Ind. Desert 115. f. 61, 978.

Trianthema redimita Melville, Kew Bull. 1952:268, 1952.

A profusely branched, prostrate herb, tinged with purple. **Leaves** broadly obovate or elliptic-oblong, **margins** oten wavy and red. **Flowers** axillary or in forks. **Perianth** lobes 5, basaly connate, pink. **Stamens** 5. **Carpels** 2, ovary 2-celled; style 2. **Seeds** reniform, dull black.

A very common weed within the area.

Ethnobotanical uses:

Roots of the plant is given to women to procure abortion and are useful in obtruction of the liver, asthma and amenorrhoea.

Flowering: July-December; **Fruiting:** February-April.

Local Name: 'Biskhupra'

Siddiqui 31581, Chak.

As regarding the splitting of *Trianthema* into *Trianthema* and *Zaleya*, I have followed Jeffery (1960). See, Sharma M. "A note on the nomenclature of *Zaleya pentandra* (Linn.) Jeffery", Ind. Journ. For. Vol. 8, No. 4, 339, 1985.

2. **Trianthema** Linn.

Trianthema portulacastrum Linn. Sp. Pl. 223, 1753.

Trianthem monogyna Linn. Mant. 69, 1767; FBI. 2:660, 1879; FUGP. 1:353, Repr. ed. 1960.

Trianthema obcordata Roxb. Fl. Ind. 2:445.

A proatrate, glabrous or puberulous herb, somewhat succulent. **Leaves** glabrous, petioles shorter than in case of *Z. pentandra*.

Flowers solitary, sunken in patiolar sheath, pink. **Perianth** lobes 5, slightly saccate. **Stamens** 15-2Ø. **Ovary** 1-celled, style 1. **Fruit** circumscissile. **Seeds** black, shining, rugose.

Abundant, a common weed.

Flowering: June-October; **Fruiting:** July-November.

Siddiqui 315Ø6, Kahoura.

LV. APIACEAE (UMBELLIFERAE nom. alt.)

Key to Genera:

Flowers yellow.

Fruits narrowly winged .....1. *Anethum*

Fruits ribbed .....2. *Foeniculum*

Flowers white, pinkish or purple.

Plants either creeper or stoloniferous.

Leaves orbicular or reniform.

Leaves not lobate or partite; mericarp 7-9 ribbed .....3. *Centella*

Leaves lobate or partite, smaller; mericarp 3-ribbed .....4. *Hydrocotyle*

Leaves pinnately compounds; plant stoleniferous .....5. *Oenanthe*

Plants erect or neary so and without rooting at nodes or stolons.

Roots conical, pink to purple, edible .....6. *Daucus*

Roots normal.

Plants hispidly hairy; leaves do not exhibit dimorphism with age .....7. *Seseli*

Plants quite glabrous; leaves

shallowly lobed before flowering and decompound after flowering .....8. *Coriandrum*

1. **Anethum** Linn.

Anethum graveolens Linn. Sp. Pl. 263, 1753; Buw. Blumea 2:202, 1936; Fl. Males. Ser. 1. 4:136, 1949; HFDD. 210, 1977.

Peucedanum graveolens (Linn.) Hiern, Fl. Trop. Afr. 3:19, 1871; FBI. 2:709, 1879; FUGP. 1:363, Repr. ed. 1960.

An erect,glabrous anuual herb. **Stem** terete, striate. **Leaves** upper sessile, lower patioled, otherwise all similar, decompound. **Flowers** yellow all similar. **Umbellules** 6-25 flowered. **Fruits** oblong, narrowly winged.

Cultivated for the green leaves vegetables, often found as an escape.

Flowering: December-February; **Fruiting:** March-April.

Local Name: 'Soya'

Siddiqui 31592, Asgaon.

2. **Foeniculum** Mill.

Foeniculum vulgare Mill. Gard. Dict. ed. 8, n. 1, 1768; FBI. 2:695, 1879; Buw. Blumea 2:200, 1936; Fl. Males Ser. 1. 4:136, 1949; FUGP. 1:361, Repr. ed. 1960; HFDD. 214, 1977.

An erect glabrous herb. **Stem** stout, glabrous, fistular. **Leaves** pinnatipartite, segments filiform. **Flowers** in compound umbels, yellow. **Fruits** oblong or ellipsoid, ribbed. This plant differs

from *Anethum graveolens* in having larger umbels.

Cultivated, often found as an escape.

Ethnobotanical uses:

Leaves are diuretic, stimulant, digestive, appetizing, lactagogue, they are usefull in cough, colic and thirst. Seeds are anthelmintic, carminative, lactogogue, it is given in eye diseases, burning sensation, fever, thirst, wounds, dysentery, spleen and kidneys etc.

Flowering: January-March; **Fruiting:** April-May.

Local Name: 'Saonf'

Siddiqui 31213, Khera.

3. **Centella** Linn.

Centella asiatica (Linn.) Urb. in Mart. Fl. Bras. 11:287. t. 78. f. 1, 1879; Buw. Blumea 2:134, 1946; Fl. Males Ser. 1. 4:117, 1949; Hiroe, Umbel. Asia 1:89, 1958; HFDD. 213, 1977.

Hydrocotyle asiatica Linn. Sp. Pl. 234, 1753; FBI. 2:669, 1879; FUGP. 1:391, Repr. ed. 1960.

A perennial herb. **Stem** creeping with long stolons, nearly or hairy on young parts. **Leaves** in a rosette, reniform, long petioled. **Umbels** very shortly peduncled. **Calyx** teeth absent. **Petals** Ovate-rounded, red. **Fruits** of two mericorps, distinguishable by a shallow furrow.

Commonaly found in moist places, sandy and loamy soils.

Ethnobotanical uses:

The plant is used in various skin diseases, piles, enlargement of glands, chronic rheumatism, amenorrhoea and to purifier of blood. The leaf juice is locally applied in elephanteasis, inflammations and swellings.

Flowering: October-March; **Fruiting:** January-April.

Local Name: 'Brahmi-booti'

Siddiqui 31513, Atwa.

The plants associated with *Zornia gibbosa*, *Limnophila chinensis*, *Hygrophila* sps. and *Polygonum* sps.

4. **Hydrocotyl** Linn.

Hydrocotyl sibthorpioides Lamk. Encycl. 3:153, 1789; Buw. Blumea 2: 128, 1936; Fl. Males Ser. 1. 4:115, 1949; Hiore, Umbel. Asia 1:10, 1958; Shan & Liou, Act. Phytotax. Sin. 9:125, 1964; HFDD. 215, 1977.

Hydrocotyl rotundifolia DC. Prodr. 4:64, 1830; FBI. 2:668, 1879; FUGP. 1:358, Repr. ed. 1960.

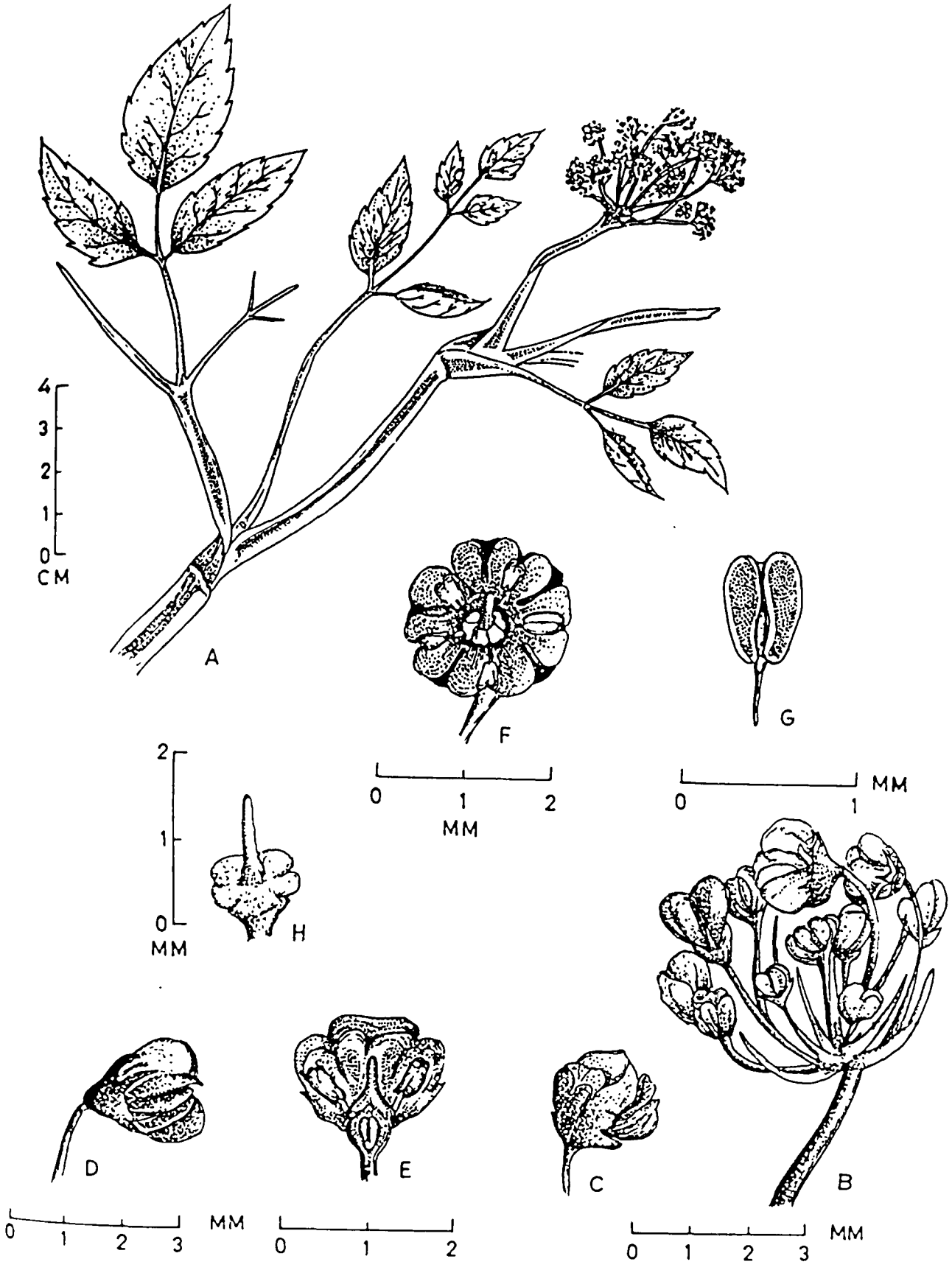
A glabrous herb. **Leaves** smaller than those of *Centella*, cordate, lobed to or beyond the middle. Peduncles very short. **Flowers** pink. **Fruits** broader than long.

Often found in moist and muddy situations.

Ethnobotanical uses:

Leaves are given with cumin and sugar in case of diarrhoea and dysentery, and juice is applied to skin eruptions.

Oenanthe javanica (Bl.) DC.
A. Flowering branch, *B.* Inflorescence, *C.* Flower, *D.* Flower (LV), *E.* Flower (LS), *F.* Open flower, *G.* Stamen, *H.* Pistil.



Oenanthe javanica (BL.) DC.

Flowering: November-March; **Fruiting:** February-April.

Local Name: 'Brahma-mundi'

Siddiqui 31562, Baturi purva.

5. **Oenanthe** Linn.

Oenanthe javanica (Bl.) DC. Prodr. 4:138, 1830; Buw. Blumea 2:194, 1936; Fl. Males Ser. 1. 4:136, 1949; HFDD. 215, 1977.

sium javanica Bl. Bijdr. 15:881, 1826.

Oenanthe stolonefera DC. Prodr. 4:138, 1830; FBI. 2:696, 1879; FUGP. 1:395, Repr. ed. 1960.

A stoloneferous, glabrous herb, with fistular stem, offshoots ascending or erect. **Leaves** usually 1-pinnate; leaflets 3-5, serrate, acute, petioled long; umbels compound and terminal and/or leaf opposed. **Flowers** white. **Fruits** with swollen ribs.

Common on the bank of the river and other 'nallahs'.

Flowering: January-March; **Fruiting:** April-May.

Siddiqui 31253, Jhala.

Plants associated with *Ipomea aquatica*, *Polygonum* sps, *Grangea maderaspatana*, *Eleocharis palustris*.

6. **Daucus** Linn.

Daucus carota Linn. Sp. Pl.242, 753; Roxb. Fl. Ind. 2:90; W. & A. Prodr. 374; Royle III, 229; FBI. 2:718, 1879; Field & Gard. Crops Part, 3:9. t. 78; Fl. Delhi, 178, 1963.

A hispid herb, with conical tape root, orange-yellow or deep purple. Leaves 2-pinnate and looking as decompound due to further

division of pinnae. Flowers in decompound umbels; flowers white or light pink, the central one in each simple umbel, mostly purple. Fruit elliptic, dorsely compressed, covered with long hispid spreading hairs.

Cultivated in kitchen gardens.

Ethnobotanical uses:

A well known medicinal plant.

Flowering: february-March; **Fruiting:** April.

Local Name: 'Gajar'

Siddiqui 31272, Mama purva.

7. Seseli Linn.

Seseli diffusum (Roxb. ex Sm.) Santapau & Wagh. in Gul. Bot. Surv. Ind. 5(2):108, 1963.

Seseli indicum Wight & Arn. Prodr. 371, 1834; FBI. 2:693, 1879; FUGP. 1:362, Repr. ed. 1960.

Ligusticum diffusum Roxb. ex Sm. In Rees Cyclop. 21:1, 1912.

A densely hairy annual, ascending or diffused herb. Leaves 2-pinnate, segments ovate, oblong or linear-lanceolate, pubescent. Flowers in compound umbels, whitish-pink. Petals 5, deeply notched. Stamens 5; filaments incurved. Style 2, spreading. Fruits prominentely ridged, subglobose, vittae distinct.

Common, found on drying water logged soil.

Flowering: February-April; **Fruiting:** May.

Siddiqui 31293, Kundouli.

Plants associated with *Cichorium intybus*, *Hygrophila auriculata*, *Ammannia baccifera* etc.

8. **Coriandrum** Linn.

Coriandrum sativum Linn. Sp. Pl. 256, 1753; FBI. 2:717, 1879; FUGP. 1:397; Buw. Brumea 2:171, 1936; Fl. Males Ser. 1. 4:128, 1949; Hiroe, Umbel. Asia 1:127, 1958; HFDD. 213, 1977.

An erect glabrous annual herb. **Leaves** initial leaves palmati-lobed partite; subsequent leaves become more and more dissected, finally becoming decompound. **Umbels** terminal and axillary. **Flowers** purple, outer ones in the umbel zygomorphic and inner one actinomorphic. **Fruits** with undulated primary ribs, greenish or yellow.

Extensively cultivated for the sake of leaves and fruits.

Ethnobotanical uses:

Well known medicinal uses of the plant.

Flowering: December-March; **Fruiting:** April-May.

Local Name: 'Dhaniya'

Siddiqui 31280, Hardoi.

LVI. ALANGEACEAE

Alangium Lamk. nom. Cons.

Alangium salvifolium (Linn. f.) Wang. in. Engl. Pflanz. 4(220b): 9. f. 2A-E, 1910; Koord. in. Schum. Syst. Verz. 1:fam. 229,103,1912; Bloembergen. in Bull. Jard. Bot. Built. Ser. III, 16:149, 1939.

Griewia salvifolia Linn. f. Suppl. Sp. Pl. 409,1781. Ssp. *Salvifolium A. Salvifolium* Ssp. *Decanetolum* Wang. in. Engl. Pflanz. 4(220b): 11,1910.

Alangium lamarckii Thw. Enum. Pl. Zeyl. 133, 1859:FBI. 2:741, 1879; FUGP. 1:368, Repr. ed. 1960; Ind. Tr. 354, Repr. ed. 1971.

A shrub or small tree. **Bark** greyish-white, branchlets generally spinescent. **Leaves** simple, alternate, elliptic, oblong, acuminate, glaborous above, glabrescent beneath. **Flowers** fragrant, creamy white, 5-8 (usually 5), merous, solitary or fasciculate. **Sepals** 5-10, connate, tuberipped, wooly pubiscent. **Petals** 5-8, free, slightly connate at base, linear-lanceolate, creamy or yellowish white, reflexed, woolly tomentose outside when young. **Stamens** variable in no. usually 10-20 upto 30, free, filaments plumose at base, with white silky hairs; **Anthers** 2-celled. **Ovary** 1-celled, crowned with the disk; style 1 long; stigma capitate. **Fruit** ellipsoidal drupe, purple when ripe, crowned with persistent calyx-lobes, 1-seeded.

Found in scrub forest.

Ethnobotanical uses:

Fruits are given in inflammation and skin diseases. The root bark is also used as an anthelmintic purgative and diuretic.

Flowering: January-February; **Fruiting:** February-April.

Local Name: 'Akola'

Siddiqui 31214, Khera.

LVII. RUBIACEAE

Key to Genera:

Herbaceous plants; flowers in axillary clusters or peniculate cymes;

- Fruits many seeded ..... 1. *Oldenlandia*
- Fruits one-seeded ..... 2. *Borreria*

Large shrubs or trees.

- Flowers dense globose heads:
  - Calyx tube free, not fused in fruits; fruits almost dry ..... 3. *Cephalanthus*
  - Calyx tube fused in fruits to form fleshy syncorpium of drupes ..... 4. *Anthocephalus*
- Flowers not in globose heads:
  - Ovules more than 2, usually many in each cells;
    - Fruit dehescent capsular..... 5. *Wendlandia*
    - Fruit indehescent barries; fleshy or dry:
      - Ovary two-celled, placentae on septa..... 6. *Randia*
      - Ovary one-celled, placentae parietal..... 7. *Gardenia*

Flowers greenish small in axillary clusters .....8. *Hyptianthera*

Ovules solitary in each cell:

Corolla lobes valvate:

Fruit drupes; flowers not foetid .....9. *Meyna*

Fruit capsular, flowers foetid when bruised .....10. *Hamiltonia*

Corolla lobes twisted (inbud):

Leaves coriaceous; style 2-fid .....11. *Ixora*

Leaves membranous; style simple .....12. *Pavetta*

1. **Oldenlandia** Linn. emend. Brem.

Oldenlandia corymbosa Linn. Sp. Pl. 119, 1753; FBI. 3:64, 1880, proparte; FUGP. 1:380 Repr. ed. 1960 (excl. syn. *Hedyotis burmanniana* Wall. ex Wt. & Arn); Brem. Varh. Kon. Akad. Wet. 48:254, 1952; Lewis, Ann. Mis. Bot. Gard. 53:257-258, 1966; HFDD. 277, 1977.

A spreading, decumbent herb. **Stem** angular, glabrous. **Leaves** linear, lanceolate, acute, entire, nerves obscure, margins revolute. **Flowers** in axillary long peduncled 2-4 flowered cymes. **Calyx** lobes ovate, triangular, acute, distant in fruit. **Corolla**

with or pale-purple; tube short. **Capsule** didymous or globose.

Abundant, found in grass land, road side and cultivated fields.

Ethnobotanical uses:

The whole plant is considered a cooling medicine in important the treatment of fever. Decoction of plant is also used in fever.

Flowering: July-August; **Fruiting:** September-October.

Local Name: 'Pitpapra'

Siddiqui 31448, Kahoura.

2. **Borreria** G. F. W. Mey., nom. cons.

Borreria articularis (Linn. f.) F. N. Williams, Bull. Herb Boiss. 2(5):956, 1905; HFDD. 221, 1997.

Spermacoce articularis Linn. f. Suppl. Pl. 119, 1781.

Spermacoce hispida Linn. Sp. Pl. 702, 1753 (non *B. hispida* Spruce ex K. Schum. 1888); FBI 3:200, 1881; FUGP 1:395, Repr. ed. 1960.

Borreria hispida (Linn.) K. Schum. Pflanzenfam. 4. 4:144, 1891 (non Spruce ex K. Schum. 1888).

A procumbent or prostate herb; **Stem** hispid hairy or sub-glabrous, quadrangular. **Leaves** sub-sessile, obovate, spathulate, oblong or elliptic, acute or obtuse or rigidly coriaceous, pale when dry, usually very scabrid above, some time tinged with red, margin often thicked and cartilagenous, scabrid or ciliate; stipule membranous, hispid and fimbriate, fibria much longer than the body of stipule. **Flowers** 4-6 in a whorl, shortly pedicelled. **Calyx** hispid, teeth, linear-lenceolate. **Corolla** salver shaped, 4-partite, oblong, acute bristle outside near the top. **Stamens**

4, inserted to mouth or above the middle; filaments short. **Style** long; stigma 2, capitate, hairy. **Seeds** brown, cylinderical, rounded on the both ends and ridged on onside.

Abundant, on road side, grass-land and sandy localities.

Flowering: August-September; **Fruiting:** September-October.

Siddiqui 31493, Sadai behta.

3. **Cephalanthus** Linn.

Cephalanthus occidantalis Linn. Sp. Pl. 95, 1753.

Cephalanthus naucleoides DC. Prodr. 4:539, 1830; FBI. 3:24, 1880. *Nauclea tetrandra* Roxb. Hort. Beng. 14; 1814, nom. nud. & Fl. Ind. 1:518, 1832; FUGP. 1:374, Repr. ed. 1960.

Large bushy shurb or small tree, 2-6 m tall. **Leaves** opposite or in whorls of 3-4, ovate, elliptic or lanceolate, acuminate, entire, petioled. **Flowers** white, fragrant, in axillary globose heads; peduncled. **Calyx** 4 or 5, connate, campanulate. **Corolla** 4-5, connate, trumpt shaped. **Stamens** 4-5, inserted at the throat of corolla; anthers subsessile long. **Ovary** 2-celled, ovule, solitary in each cell; style filiform, stigma valvate. **Fruits** numerous, 1-seeded, indehescent, dry, quandrangular, crowned by the persistent calyx.

Growing in swampy situations.

Flowering: March-June; **Fruiting:** Cold seasons.

Siddiqui 31270, Mama purva, Lucknow road.

4. **Anthocephalus** A. Rich. emend. Haviland.

Anthocephalus chinensis (Lamk.) Rich. ex Walp. Rep. 2:46, 1843;

Bakh. f. in. Taxon. 19:469, 1970; Suppl. FUGP. 89, 1976.

Cephalanthus chinensis Lamk. Encycl. 1:678, 1785.

Anthocephalus indicus A. Rich. in. Mem. Soc. Hist. Nat. Par. 5:238, 1834; FUGP. 1:397, Repr. ed. 1960; FPP. 128, 1978.

Anthocephalus cadamba (Roxb.) Miq. Fl. Ind. Bot. 2:135, 1856; FBI. 3:23, 1880; Ind. Tr. 367, Repr. ed. 1971.

Nauclea cadmba Roxb. Hort. Beng. 14, 1814; Fl. Ind. 1:512, 1832.

A medium sized tree. **Bark** dark brown. **Leaves** elliptic orbicular, coriaceous, glabrous, compact heads, yellow. **Calyx** persistent. **Corolla** lobes erect, infundibuliform. **Fruit** a capsule. **Seeds** many, dark brown wingless.

Rare, planted as an ornamental and sacred tree.

Ethnobotanical uses:

Fresh juice of bark is applied to the heads of infants when the fontanelled sinks; at the same time a small quantity mixed with cumin and sugar is given internally. In inflammation of eyes the bark juice with equal quantities of lime juice, opium and alum is applied round the orbit.

Flowering: May-August; **Fruititng:** August-December.

Local Name: 'Kadamba'

Siddiqui 31333, Hardoi.

5. **Wendlandia** Bartl.

Wandlandia tinctoria DC. Prodr. 4:411, 1830; FBI. 3, 38, 1880; FUGP. 1:385. Repr. ed. 1960; Ind. Tr. 374, Repr. ed. 1971.

Pondeletia tinctoria Roxb. Hort. Beng. 14, 1814, 8, Fl. Ind. 1:522, 1832.

A small tree. **Leaves** obovate, acuminate, glutinous above, pubescent beneath. **Flowers** sessile, white, in compact terminal panicles; bracts subulate. **Anthers** shortly exerted; filaments short. **Capsule** roundish, hairy; reddish brown when ripe.

Occasionally found in the forest.

Flowering: January-March; **Fruiting:** March-April.

Siddiqui 31271, Mama purva.

6. **Randia** Linn.

Randia uliginosa DC. Prodr. 4:386, 1830; FBI. 3:110, 1880; FUGP. 1:385, Repr. ed. 1960; Ind. Tr. 381, Repr. ed. 1971.

A small rigid, deciduous tree; branchlets quandrangular, bearing at their ends 1-4 decussate thorns about 1.5 cm long. **Leaves** croweded at the ends of branchlets, obovate or oblong, base cuneate, glabrous and shining above, pubescent beneath. **Flowers** solitary, axillary, white, scented, dimorphic, either large and sessile or small and pedicelled. **Calyx** tube terate persistent. **Corolla** in sessile flowers shorter and with 2-ditaled stigmas. **Fruits** ovoid, yellow, berry edible. **Seeds** smooth, compressed in a pulp.

Usually found in marshy situations.

Ethnobotanical uses:

The unripe roasted fruit is used as a domestic remedy for diarrhoea and dysentery.

Flowering: May-June; **Fruiting:** Februrary-April.

Local Name: 'Pinda'

Siddiqui 31387, Lakhimpur road.

7. **Gardenia** Linn.

Gardenia turgida Roxb. Hort. Beng. 15, 1814; FBI. 3:118, 1880; FUGP. 1:388, Repr. ed. 1960; Ind. Tr. 378, Repr. ed. 1971.

A small deciduous tree. **Branches** nearly spines axillary often leaf bearing. **Leaves** variable, elliptic or sub-orbicular, often crowned on dwarf shoots. **Flowers** dimorphic; males fascicled, the females or hermophrodite flowers solitary. **Calyx** of female flowers larger than the males. **Corolla** similar, white, salver shaped. **Fruits** ovoid or globose, pericarp fleshy, indocarp woody; placentae usually 5. **Seeds** pale brown.

Common in dry situations.

Flowering: March-May; **Fruiting:** April-May.

Siddiqui 31359, Pokher.

8. **Hyptianthera** Wt. & Arn.

Hyptianthera stricta Wt. & Arn. Prodr. 399, 1834; FBI. 3:121, 1880; FUGP. 1:389 Repr. ed. 1960; Ind. Tr. 384, Repr. ed. 1971.

A ever green shrub or rarely a small tree branching from the base. **Leaves** oblong or lanceolate, coriaceous, dark green, glabrous, entire; stipules triangular, persistent. **Flowers** white, in dense axillary fascicles. **Calyx** with short limb. **Corolla** shorter that calyx, tubulor. **Anthers** sub-sessile, inserted. Disk epigynous, annular, cushion like. **Ovary** 2-celled; style stout, villous, short; stigma deeply 2-cleft, large hairy. **Fruits**

globose-oblong berry of a pea size, topped by calyx limb. **Seeds** 4-6 in each cell.

Found in moist places.

Flowering: February-March; **Fruiting:** April-May.

Siddiqui 31238, Kundouli.

9. **Meyna** Link.

Meyna laxiflora Robyns in Bull. Jard. Bot. Bruxelles 11:288, 1928; Santapau in Bull. Bot. Surv. Ind. 3:2Ø, 1961; Fl. Khandala 118, 1967.

Vanguería spinosa Hook. f. in FBI. 3:136, 1882; Raizada in Journ. Ind. Bot. Soc. 14(4):154, 1935.

A deciduous shrub with pubescent branchlets. Spines supra-axillary. **Leaves** simple, ovate, elliptic or elliptic oblong, pubescent both surfaces, cuneate at base, lateral nerves 6-9 pairs; petioled, stipules connate, base broad sharply acuminate. **Flowers** greenish-yellow or white, in globose peduncled cymes, axillary or supra-axillary; pedicels filiform. Bracts setaceous. **Calyx** hairy; lobes 5 rotate, distant, linear. **Corolla** in duplicate-valvate, tube short, woolly, lobes reflects when mature. **Stamens** sub-sessile; anthers extrudent. Disk epigynous, cushion like. **Ovary** 3-6 celled, ovule one in each cell. **Style** subulate. **Stigma** capitate. **Fruits** globose with 3-6 stones, edible.

Rarely found along the edges of open forest in dry and sandy soils.

Flowering: April-May; **Fruiting:** August-September.

Siddiqui 31317, Asgaon.

10. **Hamiltonia** Roxb.

Hamiltonia suaveolens Roxb. Hort. Beng. 15, 1814, nom. nud. & Fl. Ind. 1:554, 1832; FBI. 3:197, 1880; FUGP. 1:391 Repr. ed. 1960; Ind. Tr. 390 Repr. ed. 1971.

Spermadictyon suaveolens Roxb. Cor. Pl. t. 236, 1799.

A small or large shrub, some times a small tree. **Bark** brown, peeling off in thin pieces. **Leaves** ovate, elliptic or lanceolate, opposite, coriaceous, hard and rough, lateral nerves 10-16 pairs. **Flowers** purple or bluish, polygamous, fragrant but foetid when bruised, in terminal trichotomously branched penicles. **Sepals** 5 or 4, connate, oblong-lanceolate, densely hairy. **Petals** 5, connate, densely hairy, trumpt shaped, oblong, short valvate. **Stamens** inserted on throat of corolla. **Ovary** 1-celled with 5 carples; style 5-fid. **Capsule** ovoid or ellipsoid, 1-celled. Seeds 5 or less, elogated, triquetrous testa reticulate.

Found usually on dry situations.

Flowering: September-January; **Fruiting:** December-February.

Siddiqui 31526, Saktapur.

11. **Ixora** Linn.

Ixora parviflora Vahl., Symb. 3:11, t. 52, 1794; Roxb. Fl. Ind. 1:383, 1832; FBI. 3:142, 1880; FUGP. 1:389, Repr. ed. 1960; Ind. Tr. 388, Repr. ed. 1971.

A small glabrous tree or shrub. **Leaves** oblong or elliptic,

coriaceous, hard, shining, sessile or shortly petiolate; stipules interpetiolar, cuspedate. **Flowers** white or pink, scented in ample, nearly sessile, compound, trichotomous cymes, 4-merous rarely 5-merous. **Corolla** glabrous, lobes oblong, reflexed. **Anthers** bases tailed; style hairy. **Fruit** a drupe, depressed globose, reddish or black when ripe.

Commonly found along revulets and nalas.

Ethnobotanical use:

Flowers are pounded in milk, given for wooping cough.

Flowering: February-May; **Fruiting:** May-June.

Local Name: 'Katha-gandhal'

Siddiqui 31228, Etouly, Sitapur road.

12. **Pavetta** Linn.

Pavetta indica Linn. Sp. Pl. 110, 1753; FBI. 3:150, 1880; FUGP. 1:390, Repr. ed. 1960; Ind. Tr. 387, Repr. ed. 1971.

Ixora pavetta Roxb. Fl. In. 1:385, 1832.

A large shrub, glabrous or tomentose, branchlets obtusely quadrangular. **Leaves** elliptic-lanceolate, some times lanceolate or obovate, glabrous or slightly pubescent, sub-coriaceous or membranous; patiole. **Flowers** white, scented, pedicelled; in ample, trichotomous, pubescent cymes, terminal or at the ends of branchlets. **Calyx** pubescent, truncate, or with short triangular teeth, 4-reflexed. **Corolla** salver-shaped, 4-lobes, oblong, twisted. **Stamens** 4, on the mouth of corolla; filaments short; anthers exerted. **Ovary** 2-celled; style filiform; stigma 1,

fusiform. Drupe globose, smooth with 1-2 plano-convex seeds.

Found in damp shady localities.

Flowering: Rainy season; **Fruiting:** Cold season.

Siddiqui 31468, Gulamau.

The following plants are also cultivated within the area in gardens and paths.

1. **Hamilia patens** Jacq. Enum. Pl. Carrib. 16, 1760; Bor. & Raiz., Beaut. Ind. Cl. & Sh. 96, f. 61, Pl. 32. 33, 1954, Fl. Delhi 182, 1963.

Hamilia erecta Jacq. Enum. Pl. Carrib. 16, 1760.

A large ever green shrub. **Leaves** whorled, unequal, elliptic-oblong. **Flowers** in terminal much branched, open cymes, 5-merous, orange-red. **Berries** broadly oblong, ribbed.

Flowering: May-October; **Fruiting:** November-December.

Siddiqui 31953, Bal Vidhya Mandir.

2. **Mussaenda luteola** Delile, Cent. Pl. Meroe. 65. t. 62, 1826; Bor. & Raizada 80, f. 50, Pl. 25, 1954; Fl. Delhi 181, 1963.

An erect shrub. **Leaves** opposite, ovate-elliptic, acute-acuminate. **Flowers** yellow, in terminal cymes. One calyx lobe gets transformed into conspicuous yellow leaf.

Flowering: March-April.

Siddiqui 31947, Hardoi.

LVIII. ASTERACEAE (COMPOSITAE nom. alt.)

Key to Genera:

Heads simple, terminal or axillary:

Flowers homogamous, tubular:

Involucral bracts numerous, multiseriate;heads terminal or axillary:

Receptacles naked or pitted; anther base obtuse ...1. *Vernonia*

Receptacles densely bristly; anther base sagittate ...2. *Tricholepis*

Involucral bracts campanulate; 2-3 seriate; heads terminal ...3. *Ageratum*

Involucral bracts 1-seriate; heads terminal ...4. *Emilia*

Flowers heterogamous, tubular:

Involucral bracts not scarious:

Involucre campanulate, bracts many seriate:

Anther cells appendiculate ...5. *Blumea*

Anther cells not appendiculate:

Leaves not woolly

tomentose:

Leaves decurrent along stem ...6. *Laggera*

Leaves not decurrent, linear ...7. *Erigeron*

Leaves woolly tomentose; semiamplexicual:

Anther bases obtuse; pappus 1-seriate:

Aromatic shrub or undershrub; pappus white, setaceous ...8. *Inula*

Herbs; pappus long, copious, reddish at length ...9. *Conyza*

Anther bases sagittate; pappus 2-seriate unequal..10. *Pulicaria*

Involucre patelliform, bracts 3-seriate ..11. *Grangea*

Involucral bracts scarious:

Pappus hairy, one - seriate, thickened at the tips ..12. *Gnaphalium*

Pappus none or minute:

Non-aromatic herbs ..13. *Cotula*

Aromatic herb or under-shrubs ..14. *Artemisia*

Involucral bracts spiny:

Leaves spinescent; pappus plumose hairy ..15. *Cirsium*

Leaves not spinescent; pappus bristly ..16. *Amberboa*

Flowers heterogamous; ligulate towards periphery and tubular in the disk region:

Leaves pinnatisect or pinnately compound (simple in *Eclipta*):

Pappus 2-4, stiff, divaricate awn-like ..17. *Bidens*

Pappus feather scale-like ..18. *Tridax*

Pappus represented by minute structures:

Pappus of two-five minute teeth; florets creamy-white ..19. *Eclipta*

Pappus represented by a

minute rim; florets light yellow:

Leaves mostly radical; achenes with 2 persistent bristles (awns) ..20. *Glossogyne*

Leaves mostly cauline, alternate; achenes not awned ..21. *Chrysanthellum*

Leaves simple not pinnatisect:

Anther bases apendiculate ..22. *Vicoa*

Anther bases not apendiculate:

Achenes enveloped in navicular stiff bracts ..23. *Sclerocarpus*

Achenes not enveloped in bracts:

Involucral bracts 4, broad; florets greenish-white ..24. *Enydra*

Involucral bracts 2-seriate; florets white ..25. *Centipeda*

Flowers homogamous ligulate:

Florets yellow; achenes flattened

or truncate; pappus hairy:

Achenes beaked, truncate, columnar and ribbed:

Heads small, arranged corymbosely ..26. *Youngia*

Heads larger, arranged racemosely or paniculately ..27. *Launaea*

Achenes not beaked, compressed..28. *Sonchus*

Florets blue; achenes truncate; pappus paleaceous ..29. *Cichorium*

Heads simple, monoecious ..30. *Xanthium*

Heads compound:

Heads terminal, long peduncled:

Involucral bracts spinescent; florets light blue ..31. *Echinops*

Involucral bracts not spinescent:

Stem winged; florets in terminal globose capitula, deep purple or violet ..32. *Sphaeranthus*

Stem not winged; heads not globose; florets reddish-violet..33. *Elephantopus*

Heads axillary sessile; involucral bracts 2-seriate; florets bluish-white ..34. *Caesulia*

1. **Vernonia** Scheb., nom. cons.

Vernonia cinerea (Linn.) Less. Linnaea 4:291, 1829; FBI. 3:233, 1881; FUGP. 1:402, Repr. ed. 1960; HFDD. 287, 1977.

Conyza cinerea Linn. Sp. Pl. 862, 1753.

An erect (sometimes ascending) herb, thinly pubescent. **Stem** simple to extensively branched. **Leaves** petiolate; ovate-lanceolate, acute, crenate or serrate (-entire). **Heads** in open corymbs. **Involucral bracts** linear, sharply acute, hairy. **Corolla** pink. **Anthers** cleft at the base. **Style** arms hairy. **Pappus** long copious, white; outer ring of short hairs. **Achenes** cylindric, appressed shortly hairy.

Found in cultivated fields and waste places.

Flowering & Fruiting: Round about the year, except the summer. Siddiqui 31582, Chak.

Plants associated: *Argemone mexicana, Fumaria indica, Partulaca oleraceae* etc.

2. **Tricholepis** DC.

Tricholepis stictophyllum Clarke, Comb. Ind. 241, 1878; FBI. 3:382, 1881; FUGP. 1:441, Repr. ed. 1960; HFDD. 286, 1977.

A subscabigerous perennial herb. **Stem** short and woody, sparingly branched; branches angular. **Leaves** sessile, half-amplexicual, linear, entire or obscure toothed. **Heads** solitary, rarely two terminal, on leafless branches. **Involucral bracts** glabrous or cottony, outer ones ovate, inner ones linear-lanceolate with flexuous tips. **Achenes** linear-oblong, compressed, truncate, many

ribbed, dilated at apex; crowned with greyish-brown plumose pappus hairs.

Commonly found in swampy situations.

Flowering: March-April; **Fruiting:** rainy season.

Siddiqui 31318, Asgaon.

3. **Ageratum** Linn.

Ageratum conyzoides Linn. Sp. Pl. 839, 1753; FBI. 3:343, 1881; FUGP. 1:405, Repr. ed. 1960; Robinson, Proc. Amer. Acad. Arts. Sci. 49:454-483, 1913; HFDD. 283, 1977.

Ageratum cordifolium Roxb. FL. Ind. 3:415.

Erect, annual herb. **Stem** often decumbent rooting at the base, hairy on the nodes and young parts. **Leaves** broadly ovate or rhomboid-ovate to triangular, subcordate, rounded or truncate at base, obtuse or acute, often acuminate at apex, serrate-dentate, glabrate or thinly long hairy, petiolate. **Heads** white or violet, in corymbs, 50-80 flowered peduncles, bracteate. **Involucral bracts** linear, sharply acute-acuminate, sparingly hairy; 2-seriate. **Flowers** all tubular and bisexual. **Corolla** pale-purple or white hairy outside, 5-clefts. **Anthers** white with an appendage on the apex; base obtuse. **Style** arms long, exserted, hairy. **Pappus** scales 5, conate below, barbed.

This is a polymorphic species varying considerably in flower colours and in size of heads.

Abundant, Found practically in every nook and corner of the area but prefers moist and shady localities.

Ethnobotanical uses:

Leaves is used in diarrhoea and colic. The juice is used in prolapse of the anus. A hot poultice of the leaves and stem is applied to leprous sores and other skin diseases.

Flowering & Fruiting: Rainy and winter season.

Local Name: 'Ajgandha'

Siddiqui 31559, Baturi purva.

4. **Emilia** Cass.

Emilia sonchifolia (Linn.) DC. in Wt. Contrib. Bot. Ind. 24, 1834; Prodr. 6:302, 1838; FBI. 3:336, 1881; FUGP. 1:436, Repr. ed. 1960; HFDD. 261, 1977.

Cacalia sonchifolia Linn., Don. Prodr. 180; Roxb. Fl. Ind. 3:413.

A slender, glaucous herb, puberulous in the hairness is more dense on the lower parts of the lateral branches than the main stem. **Stem** erect or diffused, often rooting at the nodes, branched. **Lower leaves** petiolate, lyrate-pinnate, upper segment usually the largest, obovate, entire or sinuate. **Upper leaves** smaller with coarsely toothed and undulated margins; bases amplexicaul, the auricles acute or obtuse; nerves more pronounced on abaxial surface; midrib slightly purple or not. **Heads** solitary or laxly corymbose; peduncles slender and nodding when young; mature heads cylindrical. **Involucral bracts** linear, acute, uniseriate, fused. **Corolla** tube 5-toothed, pink or white. **Anthers** in the upper part of the tube not in the middle, apex much elongated and filiform. **Style** arms half cylindric; tip conic.

Achenes 5-ribbed; ribs scabrid. Pappus white.

Abundant in moist and shady places.

Ethnobotanical use:

The plant is used as sudorific.

Flowering & Fruiting: Nearly throughout the year.

Local Name: 'Hiran-khuri'

Siddiqui 31390, Lakhimpur Road.

5. **Blumea** DC., nom. cons.

Key to species:

Flowers yellow.

Plants erect or ascending.

Receptacles glabrous; corolla lobes bisexual flowers nearly glabrous;achenes sub-4-gonous not ribbed, glabrous .....1. *B. lacera*

Receptacles hairy; corolla lobes of bisexual flowers hairy; achenes 8 - 10 ribbed, silky .....2. *B. laciniata*

Plants prostrate,decumbent; leaves small, obovate-lanceolate,coarsely spinulose dentate; stamens often absent from disk flowers .....3. *B. oxyodonta*

Flowers purple: leaves densely villous:

heads crowded at the top of branches in
long spiciform panicles; achenes hairy.....4. *B. mollis*

1. **Blumea lacera** (Burm. f.) DC. in Wt. Contrib. Bot. Ind. 14, 1834; Prodr. 5:463, 1836; FBI. 3:263, 1881; FUGP. 1:414, Repr. ed. 196Ø; Randeria, Blumea 1:264, 196Ø; HFDD. 245, 1977.

Conyza lacera Burm. f. Fl. Ind. 18Ø. t. 59. f. 1768.

Erect, aromatic somewhat viscid, with a stout taproot. Stem mostly simple, terete, often tinged with purple (especially in lower parts), long villous, glandular. **Leaves** obovate-oblong, obtuse or acute, narrowed into a short petiole at base, entire to coarsely dentate, densely on both surfaces. **Heads** in a leafy compound panicles. **Involucral bracts** linear, acute, glandular hairy. **Corolla** lobes of disk flowers, glandular hairy. **Achenes** hairy.

Common, waste places road sides, forest edges. Usually it grows in the cracks or on the denuded portions of the walls near some water outlets.

Flowering & Fruiting: May-August.

Siddiqui 31342, Chhatouri.

2. **Blumea laciniata** (Roxb.) DC. Prodr. 5:436, 1836; FBI. 3:264, 1881; Randeria, Blumea 1Ø:258, 196Ø; FUGP. 1:415, Repr. ed. 196Ø; HFDD. 245, 1977.

Conyza laciniata Roxb. FL. Ind. ed. Carey 3:428, 1832.

Erect, tall pubescent or thinly tomentose herb, branching from the base, glandular. **Lower leaves** petiolate, lyrate-pinnatifid,

relatively tougher than those of *Blumea lacera*, coarsely toothed, thinly hairy. **Flowers** in large, open terminal penicles, yellow. **Involucral bracts** linear-lanceolate, subacute, hairy. **Corolla** of disk flowers hairy. **Achenes** 8-10 ribbed, thinly hairy. **Receptacles** pitted hairy.

Commonly found within the area.

Flowering & Fruiting: March-April.

Siddiqui 31288, Lucknow Road.

3. **Blumea oxyodonta** DC. in Wt. Contrib. Bot. Ind. 15, 1834; Prodr. 5:444, 1836; FBI. 3:266, 1881; FUGP. 1:413, Repr. ed. 1960; HFDD. 247, 1977.

Prostrate or decumbent, ascending herb. **Stem** thinly appressed hairy. **Leaves** obovate or lanceolate, obtuse, cuneate, sessile, margins spinulose-dentate. **Heads** peduncled in lax-leafy panicles. **Involucral bracts** linear, lanceolate, hairy, acute. **Corolla** hairy, yellow. **Stamens** often absent in disk flowers. **Receptacles** glabrous. **Achenes** ribbed, hairy.

Common in grassy and sandy localities, agricultural fields and forest edges.

Flowering & Fruiting: January-April.

Siddiqui 31216, Khera.

4. **Blumea mollis** (D. Don) Merr. Philipp. Journ. Sci. 5:395, 1910; Randeria, Blumea 10:261, 1960; HFDD. 247, 1977.

Erigeron mollis D. Don, Prodr. 172, 1825.

Blumea wightiana DC. in Wt. Contrib. Bot. Ind. 14:1834, Prodr.

5:435, 1836; FBI. 3:261, 1881; FUGP. 1:413, Repr. ed. 1960.

Erect, strongly aromatic, viscid herb. **Stem** several from the woody base, simple or corymbosely branched at the top, patently glandular-hairy. **Leaves** obovate, oblong, sessile or subsessile; apex rounded or obtuse, crenate-serrate. **Heads** in dense, leafy, spicate, terminal panicles. **Involucral bracts** linear, acute, hairy. **Corolla** hairy, purple. **Achenes** hairy, angled, not ribbed.

Abundant. In grass lands and orchards, on road sides and waste lands.

Ethnobotanical uses:

Plant is used in strong fever, heaviness in the head, pains of the body, powdered leaves are used as a snuff. Juice of the leaves is placed in the eye to cure chronic purulent discharges; it is also used as an anthelmintic, astringent and in dysentery, chronic discharge from the uterus and in earache.

Flowering & Fruiting: January-April.

Local Name: 'Kukrounda'

Siddiqui 31217, Khera.

6. **Laggera** Sch. -Bip. ex Hochst.

Laggera aurita (Willd.) Sch. -Bip. in Schweinf. Beitr. Fl. Aeth. 151, 1867; FBI. 3:271, 1881; FPP. 143, 1978.

Conyza aurita Willd. Sp. Pl. 3:1929, 1804.

A coarse, erect, viscidly hairy herb; strongly odoriferous. **Leaves** elliptic-oblong or obovate, densely villous on both surfaces, sessile, auricled at the base, subpinnatifid. **Heads** in

axillary and terminal corymbose panicles. **Involucral bracts** glandular pubescent, tinged with purple. **Outer flowers** female, filiform. **Disc flowers** tubular, light purple. **Achenes** obscurely ribbed, thinly pubescent.

Commonly found on road sides, waste places and old walls.

Flowering & Fruiting: January-April.

Siddiqui 31310, Atwa.

7. **Erigeron** Linn.

Key to species:

Receptacle larger; achenes laxy hairy.....1. *E. bonariensis*

Receptacle smaller; achenes glabrous.....2. *E. canadensis*

1. **Erigeron bonariensis** Linn. Sp. Pl. 863, 1753; Burtt. in Kew Bull. 371, 1948; HFDD. 263, 1977.

Erigeron linifolious Willd. Sp. Pl. 3:1955. 1804.

Conyza ambigua DC. Fl. Franc. Suppl. 6:468, 1815.

Erigeron ambigua (DC.) Sch. -Bip. in Webb. & Berth. Phyt. Canar. Sect. 2:208, 1844.

An erect, deep rooted, stout annual herb. **Stem and branches** ribbed, crowded with erect leaves, clothed with short appressed hairs mixed with long, white hairs. **Leaves** linear-lanceolate or oblanceolate-spathulate with a narrowed base, entire or serulate, pubescent. **Heads** numerous, heterogamous, in terminal panicles. **Corolla** of peripheral florets ligulate, of central ones tubular, creamy-white, 5-cleft. **Achenes** brown, oblong, 4-angular, thinly

hairy. **Pappus** dirty white.

A common waste lands plant.

Flowering & Fruiting: February-September.

Siddiqui 31332, Hardoi.

2. **Erigeron canadensis** Linn. Sp. Pl. 863, 1753; FBI. 3:254, 1881; FUGP. 1:408, Repr. ed. 1960; HFDD. 263, 1977.

An erect, simple or branched herb. **Stem** faintly ribbed, branched only in the upper half. **Leaves** linear-lanceolate, apiculate, glabrous or thinly hairy. **Heads** in the combined axillary and terminal panicles, heterogamous, creamy-yellow or purplish. **Involucral bracts** 2-many seriate, linear, margins scarious. **Achenes** flat, obovoid, glabrous or thinly hairy. **Pappus** hairs dirty-white.

Common in waste lands and agricultural fields.

Flowering & Fruiting: November-March.

Siddiqui 31543, Sadai behta.

8. **Inula** Linn.

Inula cappa (Buch. -Ham. ex D. Don) DC. Prodr. 5:469, 1836; FBI. 3:295, 1881; FUGP. 1:463, Repr. ed. 1960; HFDD. 271, 1977.

Conyza cappa Buch. -Ham. ex D. Don, Prodr. 176, 1825.

Erect, aromatic, undershrub or shrub. **Stem** somewhat woody below, densely, yellowish-brown-grey tomentose on young parts. **Leaves** oblong, with an acute or rounded base, acutely mucronate, remotely denticulate, thick glabrous or thinly hispidulous on the

upper surface, densely grey-silver tomentose on lower surface. **Heads** in axillary and terminal, corymbose panicles, heterogamous. **Involucral bracts** 2-3 seriate, linear-lanceolate, acuminate, ciliate, long hairy. **Achenes** thinly hairy. **Pappus** hairs white.

Commonly found on the edges of forest.

Flowering & Fruiting: September-December.

Siddiqui 31480, Majhola.

9. Conyza Less., nom. cons.

Key to species:

Stem corymbosely branched from above the base; heads Ø.2-Ø.3 cm across .....1. *C. stricta*

Stem branching from the base(or simple); heads Ø.4-Ø.5 cm across .....2. *C. japonica*

1. Conyza stricta Willd. Sp. Pl. 3:1922, 1803; FBI. 3:258, 1881; FUGP. 1:410, Repr. ed. 1960; HFDD. 256, 1977.

Erect, villous annual herb. **Stem** branching corymbosely from above the base (branching start after lower half). **Leaves** lanceolate, linear, narrow, obtuse, apiculate, denticulate or entire. **Heads** in terminal, corymbose, dense panicles, peduncled. **Involucral bracts** 2-seriate, hairy, narrow, linear, acute. **Corolla** of peripheral flowers ligulate, creamy-white. **Disk flowers** tubular. **Anthers** apiculate.

Common. Mainly on boundaries of agricultural fields.

Flowering & Fruiting: October-March.

Siddiqui 31528, Saktapur.

2. **Conyza japonica** (Thunb.) Less. (Syn. Comp. 204, 1832, nom. invall.) ex DC. Prodr. 5:383, 1836; FBI. 3:258, 1881; FUGP. 1:410, Repr. ed. 1960; HFDD. 255, 1977.

Erect, white-villous annual or perennial herb, often multicauline with a somewhat woody base. **Stem** terete, striate, lower leaves from a rosette, often remain attached to the plant even after drying and can be easily made out. **Leaves** pubescent; lower subsessile, toothed; upper nearly entire, obovate; spathulate or lanceolate. **Heads** globose, arranged in dense or lax terminal corymbs. **Involucral bracts** 2-3 seriate, unequal, hairy, linear, acute and with scarious margins. **Outer flowers** filiform with 2-3 teeth. **Disc flowers** 5-toothed; bisexual, greenish-yellow, tubular. **Anthers** base entire. **Style** bifid, arms conical. **Receptacles** convex, pitted. **Achenes** thinly hairy. **Pappus** hairs scordidly white, uniciliate.

Abundant, on road sides, walls and waste lands prefers sandy soils.

Flowering & Fruiting: November-March.

Siddiqui 31563, Baturi purva.

10. **Pulicaria** Gaertn.

Pulicaria crispa Sch. -Bip. in Webb. Berth. Phyt. Canar. 2:223, 1836-47; FBI. 3:299, 1881; FUGP. 1:466, Repr. ed. 1960; Fl. Delhi 193, 1963.

An erect much branched herb, woolly tomentose. **Leaves** linear, oblong or obovate, appressedly hairy, margins toothed-crisped, recurved, densely appressed cottony beneath, base

auriculate-hastate. **Heads** solitary, hetrogamous, bright-yellow. **Involucral bracts** linear-lanceolate, densely hairy. **Corolla** of ray florets ligulate or sometimes obsolete; of disk florets slender tubular. **Anthers** sagittate and apendiculate at base. **Achenes** oblong-terete, sparsely pilose, crowned with barbellate. **Pappus** hairs 2-seriate.

Commonly found in moist and shady situations.

Flowering & Fruiting: February-August.

Siddiqui 31254, Jhala.

11. **Grangea** Adans.

grangea maderaspatana (Linn.) Poir. Encycl. Method. Suppl. 2:825, 1811; FBI. 3:247, 1881; FUGP. 1:407, Repr. ed. 1960; FPP. 142, 1978.

Artemisia maderaspatana Linn. Sp. Pl. 849, 1753.

A pubescent or villous annual, found in damp soil or besides water bodies. **Stem** many, prostrate and spreading in all directions from the root forming circular patches. **Leaves** many, sessile, sinuately pinnatifid, pubescent on both the surfaces, lobes coarsely toothed, the terminal lobes largest. **Heads** leaf opposed (in small specimens where the leaves are crowded, the head seem axillary), solitary, rarely paired, shortly peduncled-discoid, yellow. **Outer flowers** female, 1-8 seriate, fertile, filiform, outer most 2-fid, inner 2-4 fid. **Disk flowers** bisexual; tube very slender; limb campanulate, 4-5 cleft. **Involucral bracts** 2-3 seriate, outer herbaceous, hairy, obtuse and with a single

nerve. **Anthers** slightly apiculate (acuminate). **Style** arms of hermaphrodite flowers pointed. **Receptacles** conical glabrous and smooth. **Achenes** obconical, flattened, glandular, margined in lower portion. **Pappus** cupular with fimbriate mouth.

Abundant, mainly near ditches, ponds and canals.

Ethnobotanical uses:

Leaves are used in hysteria and sometimes used in preparing anti-septic and anodyne. Leaves combined with ginger and black pepper with sugar are given as anti-septic in ulcers.

Flowering & Fruiting: October-March.

Local Name: 'Nagdoun'

Siddiqui 31514, Atwa.

12. **Gnaphalium** Linn.

Key to species:

Pappus hairs free .....1. *G. luteo-album*

Pappus hairs connate at base into a ring .....2. *G. pensylvanicum*

1. **Gnaphalium luteo-album** Linn. Sp. Pl. 851, 1753; FBI. 3:288, 1881; FUGp. 1:421, Repr. ed. 1960; HFDD. 268, 1977.

An ascending wooly herb, branching from the base. **Stem** appressed woolly. **Leaves** oblanceolate, apiculate, woolly. **Heads** many in terminal sessile clusters, golden-yellow. **Involucral bracts** 2-3 seriate, golden-yellow, shining, oblong, obtuse. **Marginal flowers** female, filiform. **Disk flowers** bisexual. **Achenes** ellipsoid,

brown. **Pappus** white.

Common on dried river and canal neds and banks.

Flowering & Fruiting: January-May.

Siddiqui 31219, Khera.

2. **Gnaphalium pensylvanicum** Willd. Enum. Hort. Berol. 867, 1809; Grierson, Notes Roy. Bot. Gard. Edinb. 31:135-138, 1971; HFDD. 269, 1977.

Gnaphalium peregrinum Fernald, Rhodora 45:479. t. 795, 1943.

Gnaphalium spathulatum Lamk. Encycl. 2;758, 1786 (non Burm. f. 1768).

Gnaphalium purpureum auct. pl. (non Linn. 1753), Hook. f. FBI. 3:289, 1881; FUGP. 1:421, Repr. ed. 1960.

Erect, annual, cottony herb. **Stem** simple or often much branched from the base, solid or terete. **Leaves** alternate, spathulate, entire, mucronate, more cottony beneath; nerves not distinct except the midrib. **Heads** in leafy, globose, axillary clusters, arranged in spikes. **Involucral bracts** membranous, acute, 3-4 seriate, shining. **Flowers** tubular, filiform; peppus nearly equalling the corolla tube cohering at the base. **Receptacles** naked, flat and tubercled or pitted. **Achenes** cylinderical and rounded on both the ends, papillose.

Abundant in agricultural fields, waste places and rosd sides.

Flowering & Fruiting: December-April.

Siddiqui 31591, Asgaon.

13. **Cotula** Linn.

Key to species:

Achenes of marginal flowers winged, leaves pinnatipartite with acute segments .....1. *C. anthemoides*

Achenes of marginal flowers narrowly margined, not winged, leaves 2-pinnatipartite with acicular tipped segments .....2. *C. hemispherica*

1. **Catula anthemoides** Linn. Sp. Pl. 891, 1753; FBI. 3:316, 1881; FUGP. 1:476, Repr. ed. 196Ø; HFDD. 258, 1977.

A small defuse herb. **Leaves** pinnatipartite, segments linear-lanceolate, sharply acute, entire glabrous. **Heads** solitary terminal on slender peduncles, heterogamous, yellow. **Involucral bracts** 2-seriate, oblong, obtuse, with a glandular brown median rib. **Marginal flowers** deovoid of corollas. **Disk flowers** with yellow corollas. **Achenes** of marginal flowers winged; of disk flowers not winged.

Common along the banks of ditches and ponds.

Flowering & Fruiting: January-April.

Siddiqui 31331, Bilgram Road.

2. **Cotula hemispherica** (Roxb.) Hook. f. FBI. 3:316, 1881; HFDD. 258, 1977; FPP. 138, 1978.

Artemisia hemispherica Roxb. Fl. Ind. 3:422, 1832.

A small prostrate or decumbent-ascending, often multi cauline

annual herb. Stem much branched glabrous, except cottony young parts. Leaves petioled, 2-pinnatisect; segments linear, oblong, entire, apiculate tip, glabrous. Heads axillary and terminal, erect on long peduncles. Involucral bracts 2-seriate, oblong, acute to obtuse. Achenes of marginal flowers brown viscid, exalate.

Not uncommon, found in moist and shady places.

Flowering & Fruiting: December-April.

Siddiqui 31583, Chak.

14. **Artemisia** Linn.

Key to species:

A dwarf herb; stem purple; leaves pinnatisect, glabrous; segments filiform .....1. *A. scoparia*

A tall herb; stem not purple;leaves broad; in dried specimens upper surface turns brownish and lower remains white due to tomenta .....2. *A. nilagirica*

1. **Artemisia scoparia** Waldst. & Kit. Descr. Pl. Rar. Hung. 1:66. t. 65, 18Ø1; FBI. 3:323, 1881; FUGP. 1:435, Repr. ed. 196Ø; HFDD. 241, 1977.

Artemisia capillaris Thunb. var. *scoparia* (Waldst. & Kit.) Pamp. Nuov. Giorn. Bot. Ital. N. S. 34:642, 1927.

An erect, aromatic, annual herb, gregarious; base woody. Stem purple, terete, glabrous, younger parts puberulous. Leaves pinnatisect; segments filiform, linear, glabrous, acute, entire.

Heads axillary, sessile, whitish-brown, forming a paniculate inflorescence. **Involucral bracts** oblong-ovate, elliptic, obtuse. **Outer flowers** female, fertile. **Inner flowers** bisexual, sterile. **Anthers** bases obtuse, entire. **Style** arms of bisexual, flowers bifid, truncate; connate in unisexual flowers. **Receptacles** convex or flat, slightly hairy or glabrous. **Achenes** minute.

Abundant on road sides, waste lands and agricultural lands. During weeding operation leaves blue-black stain on the hands.

Flowering & Fruiting: September-December.

Siddiqui 31515, Atwa.

2. **Artemisia milagirica** (Clarke) Pamp. Nuov. Giorn. Bot. Ital. N. S. 33:452, 1926; Santapau Rec. Bot. Surv. Ind. ed. 3. 16:134, 1967; HFDD. 241, 1977.

Artemisia vulgaris Linn. var. *nilagirica* Clarke, Comp. Ind. 162, 1876.

Artemisia vulgaris auct. pl. (non Linn. 1753); FBI. 3:325, 1881; FUGP. 1:435, Repr. ed. 1960.

Defers from preceding species in tall size; sulcate stem; broad leaves (lower pinnatisect) upper surface nearly glabrous, turning brown-black in dried specimens and lower surface white-tomentose. **Heads** in spiciform, secund, horizontal racemes.

Not uncommon, found along the road sides, waste places and forest edges.

Ethnobotanical uses:

The leaves and flowers are used in nervous and spasmodic

diseases, they are stomachic emmenagogue, expectorent and tonic. Juice of the leaves and its decoction is used in wooping cough and as an anthelmintic respectively. Leaves powder are given in haemorrhage, metrorrhagia, dysentery and intestinal, urinary troubles.

Flowering & Fruiting: October-December.

Local Name: 'Nag-damani'

Siddiqui 31564, Baturi purva.

15. **Cirsium** Mill.

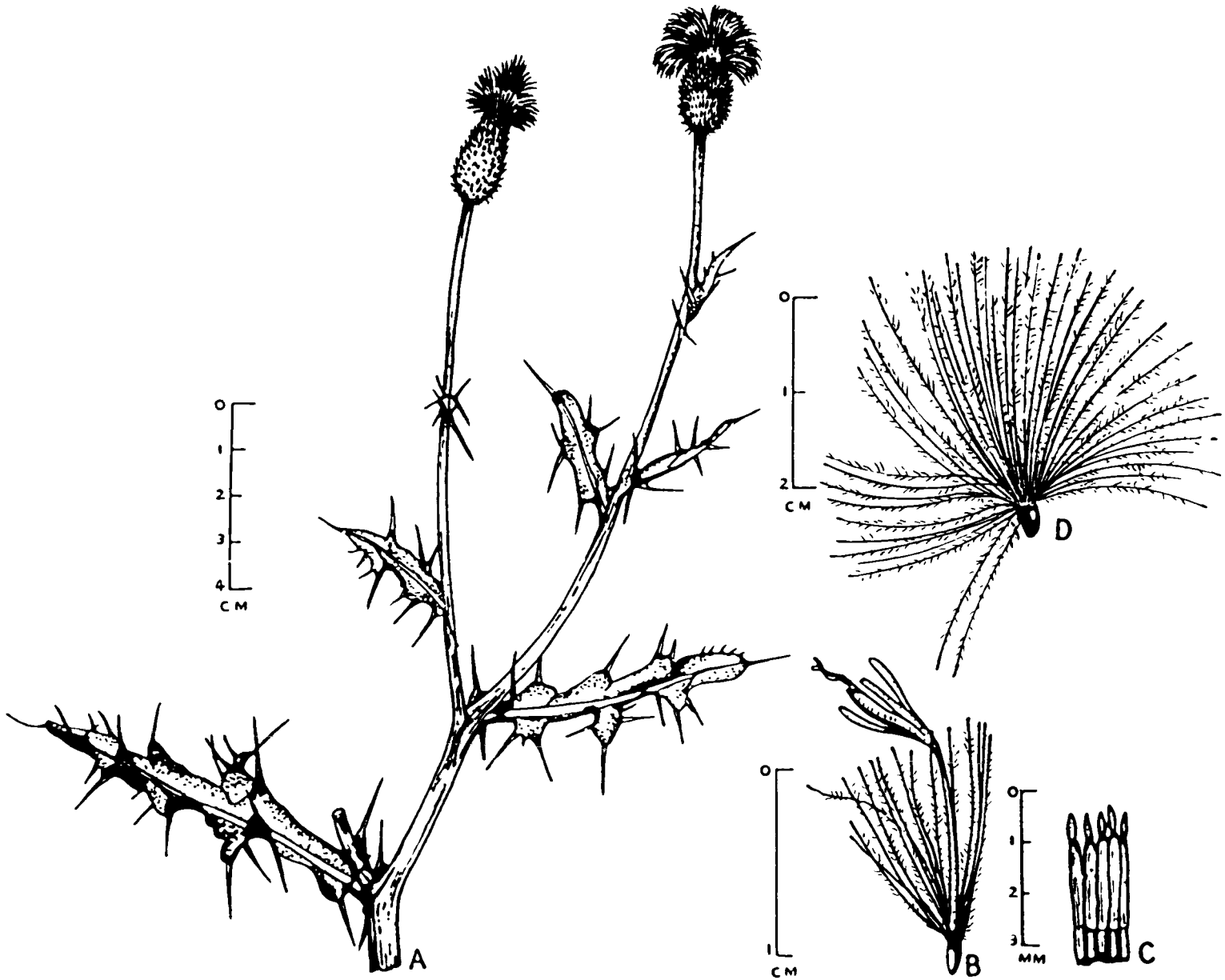
Cirsium arvense (Linn.) Scop. Fl. Carn. ed. 2. 2:126, 1772; HFDD. 254, 1977.

Serratula arvensis Linn. Sp. Pl. 820, 1753.

Cnicus arvensis (Linn.) Hoffm. Deutschl. Fl. 2(2):130, 1804; FBI. 3:362, 1881; FUGP. 1:438, repr. ed. 1960.

An erect, much branched thistle-like herb with subterranean stolons. **Stems** obtusely grooved, appressed, silky with long silky hairs. **Leaves** alternate, sessile, densely with tomentose abaxially; margins undulated and unequally, spinous; the spines on major vein endings, larger; apex acute, base decurrent. **Inflorescence** solitary-axillary. **Heads** oval before anthesis. **Involucral bracts** multiseriate; outer ones smallest and broad; inner most largest and linear, single nerved, spine tipped; the tip reflexed outwardly. **Flowers** all tubular, corolla pink. **Anthers** base shortly sagittate; apex acute. **Style** 2-fid; arms flat and glabrous. **Receptacles** conocal, long hairy. *Peppus*

Cirsium arvensis (Linn.) Scop.
A. Flowering branch, *B.* Flower,
C. Stamens, *D.* Achene.



Cirsium arvensis (Linn.) Scop.

dirty-white copious.

Common in waste places, edges and along water channels.

Flowering & Fruiting: January-April.

Siddiqui 31598, Asgaon.

16. **Amberboa** (Persoon) Less., nom cons.

Amberboa ramosa (Roxb.) Jafri in Scientist 3:29, 1959; Biologia 11(1):45, 1965; Fl. Karachi 344, 1966.

Carduus ramosus Roxb. Fl. Ind. 3:107, 1832.

Volutarella divaricata (DC.) Benth. & Hook. f. Gen. Pl. 2:476, 1873; pro parte; FBI. 3:383, 1881; FUGP. 1:442, Repr. ed. 1960.

Microlanchus divaricatus DC. Prodr. 6:562, 1837.

Volutarella ramosa (Roxb.) Santapau Ind. For. Rec. (n. s.). 4(6):145, 1955.

A diffused suberect with straggling branches. **Stem** ribbed, appressed hairy. **Leaves** variable, obovate to oblanceolate, pinnatisect. **Heads** solitary terminal. **Involucral bracts** spine-tipped. **Flowers** purplish. **Achenes** dull-brown, 3-4 angled, compressed. **Peppus** bristly, multiseriate, basally connate, silvery-brown.

Common in sandy soils.

Flowering & Fruiting: January-July.

Siddiqui 31412, Raro.

17. **Bidens** Linn.

Bidens pilosa var. *B. minor* (Bl.) Sherff, Bot. Gaz. 80:387, 1925;

Sherff, Field Mus. Nat. Hist. Bot. 16:421-429, 1937; Dakshini & Singh, Proc. Ind. Acad. Sci. (Pl. Sci.) 93(2):165-177, 1984.

An erect dwarf or tall herb. **Stem** 4-gonous, striate or sulcate. **Leaves** imperipinnately bipinnatae; segments ovate-lanceolate, serrate or unequally dentate, acute, cuniate; in dry specimens adaxial face turns darker white; abaxial face remains green. **Heads** ligulate, corymbosely panicled. **Involucral bracts** outer lines ciliate. **Anthers** sagittate. **Achenes** elongated, 4-angled, crowned with 2-4 stiff, retrorsely barbed awns.

Abundant, found on road sides, in grass lands and in gardens.

Flowering & Fruitng: April-November.

Siddiqui 31529, Saktapur.

18. Tridax Linn.

Tridax procumbens Linn. Sp. Pl. 900, 1753; FBI. 3:331, 1881; FUGP. 1:43, Repr. ed. 1960; Bowel, Brittonia 17:80, 1965; HFDD. 286, 1977.

A procumbent-ascending, hairy annual herb. **Leaves** confined to the lower 1/4 part, petiolate, dark green above, slightly fleshy; ovate, lanceolate or rhomboid, acute-subacute, cuniate; hairs tubercled base. **Heads** solitary on long hairy peduncled. **Flowers** yellowish-white to yellow. **Involucral bracts** outer densely hairy, ovate, oblong, acuminate; inner longer, membranous, glabrous. **Ray florets** ligulate; ligule 3-partite, female. **Disk florets** tubular, 5-fid, bisexual. **Style** arms hairy. **Achenes** turbinate or oblong, hairy. **Peppus** feathry, bristly.

Common all over in waste places, along road sides, railway tracks and in the crevises of old walls.

Flowering & Fruiting: Almost round the year.

Siddiqui 31375, Baturi purva.

19. **Eclipta** Linn. nom. cons.

Eclipta prostrata (Linn.) Linn. Mant. Pl. 2:286, 1771; Santapau Journ. Bomb. Nat. Hist. Soc. 52:475-476, 1956; Bull. Bot. Surv. Ind. 3:16, 1961; HFDD. 260, 1977.

Verbesina prostrata Linn. Sp. Pl. 902, 1753.

Verbesina alba Linn. Sp. Pl. 902, 1753.

Eclipta erecta Linn. Mant. Pl. 2:286, 1771; FUGP. 1:427, Repr. ed. 1960.

Eclipta alba (Linn.) Hassk. Pl. Javan. Rar. 1848; FBI. 3:304, 1881.

A strigose slender herb. **Stem** terete, erect or prostrate, rooting at nodes, green or tinged with purple. **Leaves** sessile, opposite, oblong-lanceolate, entire or serrate, strigose on both surfaces. **Heads** solitary or piared, on unequal strigose peduncled. **Involucral bracts** acute, strigose outside and glabrous inside. **Ray florets** ligulate; ligules entire or notched, white. **Disk florets** tubular, 5-toothed. **Anthers** not tailed. **Style** bifid, hairy in upper part. **Receptacles** slightly convex and bristled. **Achenes** 3-angled, 2-angles winged; faces tubercled. **Pappus** none or represented by new minute teeth.

A very common weed of the area.

Ethnobotanical uses:

A fresh plant is used as tonic and splenic enlargements and in various skin diseases. Decoction is given in headache, toothache and rheumatism. Paste of the leaves is applied to chronic glandular swellings and skin diseases and to wounds as a styptic.

Flowering & Fruiting: Practically throughout the year.

Local Name: 'Bhangra'

Siddiqui 31369, Hasia.

20. Glossogyne Cass.

Glossogyne bidens (Retz.) Alston, Handb. Fl. Ceyl. Suppl. 6:168, 1931.

Zinnia bidens Retz. Observ. Bot. 5:28, 1789.

Glossogyne pinnatifida DC. in Wt. Contrib. Bot. Ind. 19, 1834; Prodr. 5:632, 1836; FBI. 310, 1881; FUGP. 1:473, Repr. ed. 1960.

An erect perennial herb with a stout, thick, fusiform root. Stem usually many from awoody base, simple or branched, erect or ascending from the decumbent base, glabrous. Leaves mostly a rosette of radical leaves, pinnatipartite or pinnately compound, segments linear-lanceolate, entire, glabrous, cauline leaves much reduced. Heads solitary or few, peduncles. Involucral bracts i-seriate, lanceolate, glabrous. Ray florets with 3-dentate ligules, yellow. Disk florets yellow, 5-cleft. Anthers with obtuse base. Achenes black, deeply grooved. Pappus bristles two, hairy.

Common in sandy situations and along the river beds.

Flowering & Fruiting: September-March.

Siddiqui 31481, Majhola.

21. Chrysanthellum Rich.

Chrysanthellum americanum (Linn.) Vatke, Abh. Nat. Ver. Berm. 9:122, 1887; Milne-Redhead, Kew Bull. 1948:466, 1948; HFDD. 252, 1977.

Artemisia americanum Linn. Sp. Pl. 895, 1977.

Chrysanthellum indicum DC. Prodr. 5:631, 1836; FBI. 3:310, 1881; FUGP. 1:473, Repr. ed. 1960.

Prostrate or decumbent annual herb. **Stem** 3-gonous, purple-tinged, glabrous. **Leaves** lower petioled, higher ones sessile, 1-2 pinnatifid, segments lanceolate-oblong, mucronate, glabrous. **Heads** axillary and terminal, solitary peduncles. **Involucral bracts** sub-2-seriate, lanceolate, obtuse. **Marginal flowers** 8-12, with yellowish, 3-dentate ligules. **Disk flowers** yellow. **Achenes** darkish, dorsally compressed, with thick, hairy margins, slightly contracted at the top, with a minute, crown-shaped pappus.

Common in grassy, sandy localities, fields and field border.

Flowering & Fruiting: August-December.

Siddiqui 31584, Chak.

22. Vicoa Cass., nom. cons. prop.

Key to species:

Plants relatively dwarf, softly white woolly.....1. *V. vestita*

Plants tall, scabrid hairy .....2. *V. indica*

1. **Vicoa vestita** (Wall. ex DC.) Benth. ex Hook. f. FBI. 3:296, 1881; HFDD. 289, 1977.

Inula vestita Wall. (Cat. n. 2962, 1831, nom. nud.) ex DC. Prodr. 5:470, 1836; FUGP. 1:424, Repr. ed. 1960.

Erect, branched, glandular, softly pubescent-villous, annual herb. **Stem** patently white-villous. **Leaves** sessile, oblong, lanceolate, serrate, obtuse; base amplexicaul. **Heads** solitary, on woolly peduncles. **Involucral bracts** 4-seriate, linear-subulate, long-acuminate, with recurved tips. **Ray flowers** yellow. **Achenes** thinly hairy. **Pappus** scanty, white.

Commonly found in agricultural fields, sugarcane fields and along the road sides.

Flowering & Fruiting: March-June.

Siddiqui 31294, Lucknow Road.

2. **Vicoa indica** (Linn.) DC. in Wt. Contrib. Bot. Ind. 10, 1834; HFDD. 288, 1977.

Inula indica Linn. Sp. Pl. ed. 2. 1236, 1763; FUGP. 1:464, Repr. ed. 1960.

Vicoa auriculata Cass. Ann. Sci. Nat. Paris 17:418, 1829; FBI. 3:297, 1881.

Differs from the preceding species in taller habit; scabrid plant body; leaves longer and acute; **Involucral bracts** glabrous.

Commonly found within the area.

Flowering & Fruiting: October-May.

Siddiqui 31516, Atwa.

Enydra fluctuans Lour.

23. Sclerocarpus Jacq.

Sclerocarpus africanus Jacq. Icon. Pl. Rar. 1:17, t. 176, 1781; FBI. 3:305, 1881; FUGP. 1:427, Repr. ed. 1960; HFDD. 277, 1977.

Erect, branched, annual herb. **Stem** hispidly hairy terete, striate. **Leaves** opposite, ovate to lanceolate, cuneate, crenate-serrate, appressedly hairy both surfaces. **Heads** terminal, yellow, solitary, sessile or subsessile. **Involucral bracts** 2-seriate, densely pubescent. **Achenes** ovate, distinctly 3-4 ribbed, greyish-brown long, smooth. **Pappus** absent. **Paleae** boat-shaped, 5-6 nerved.

Often found in grassy field.

Flowering & Fruiting: September-November.

Siddiqui 31544, Sadai behta.

24. Enˆydra Lour.

Enˆydra fluctuans Lour. Fl. Cochinchin. 511, 1790; FBI. 3:304, 1881; HFDD. 262, 1977.

A prostrate marshy herb, rooting at the nodes. **Stem** green with purple tinged; younger parts thinly pubescent, fistular. **Leaves** opposite, decussate, sessile; leaf bases shortly auricled (more so in mature leaves), oblong, margins dentate, both the surfaces distinctly punctate; slightly fleshy. **Inflorescence** terminal, capitulum sessile with four involucral bracts, two outer larger and two inner smaller, ovate, entire and acute-obtuse, externals punctate. **Ray florets** female, embraced by a navicular pappus; petal lobes 2-3, pinkish. Style arms unequal. **Disk florets**

bisexual, reddish or brownish. **Stamens** apiculate. Both the style arms with a shallow notch. **Receptacles** conical. **Achenes** oblong.

Not uncommon, water courses and marshy localities.

Flowering & Fruiting: Winter season.

Siddiqui 31232, Kundouli.

25. **Centipeda** Lour.

Centipeda minima A. Br. & Aschers. Ind. Sem. Hort. Berol. App. 6. 1867; HFDD. 251, 1977.

Artemisia minima Linn. SP. Pl. 849, 1753.

Centipeda orbicularis Lour. Fl. Cochinch. 493, 1790; FBI. 3:317, 1881; FUGP. 1:444, Repr. ed. 1960.

A prostrate, densely leafy, much branched, annual herb. **Stem** glabrescent except cottony young parts. **Leaves** sessile, spathulate-oblong or obovate, tapering to the base, with rounded or an obtuse apex, entire to pinnatifid, especially at the top, glabrescent. **Heads** solitary, axillary, sessile or subsessile. **Involucral bracts** 2-seriate, lanceolate, obtuse. **Ray florets** with 2-toothed, white ligulate corollas. **Disk florets** yellow, 4-cleft. **Achenes** oblong, 4-angular, patently hairy on angles. **Pappus** none. **Receptacles** convex.

Abundant within the area in wet places.

Flowering & Fruiting: December-April.

Siddiqui 31599, Asgaon.

26. **Youngia** Cass.

Youngia japonnica (Linn.) DC. Prodr. 7:194, 1938; Babcock & Stebbins, Carnegie Inst. Wash. Publ. n. 484. 62, 1937; Gen. Youngia 94, 1947; HFDD. 290, 1977.

Prenanthes japonica Linn. Mant. Pl. 1:107, 1767.

Crepis japonica (Linn.) Benth. Fl. Hongk. 194, 1861; FBI. 3:395, 1881; FUGP. 1:488, Repr. ed. 1960.

Erect, annual herb with milky latex. **Stem** tubular ribbed, simple, glabrous or puberulous. **Leaves** mostly radical and in a rosette, obvate-oblong, sinuately lobbed or pinnatifid, dentate, glabrous or thinly hairy, membranous, petioled, cauline leaves few, smaller and subsessile. **Heads** numerous, filiform, glabrous, peduncles, yellow, homogenous, floral shoots corymbosely branched near the tips. **Involucral bracts** 2-seriate, outer often purple-tinged. **Corolla** yellow. **Achenes** reddish brown fusiform, falcate, alternate at both ends, ribbed and minutely rugose. **Pappus** silvery.

Common within the area in moist and shady places.

Flowering & Fruiting: January-July.

Siddiqui 31269, Mama purva.

27. **Launaea** Cass.

Key to species:

Heads terminal; latex white; a smaller plant .....1. *L. asplenifolia*

Heads more or less racemose; latex yellow; a larger plant .....2. *L. fallax*

1. **Launaea asplenifolia** (Willd.) Hook. f. FBI. 3:415, 1881; FUGP. 1:449, Repr. ed. 1960; HFDD. 274, 1977.

Prenanthes asplenifolia Willd. Sp. Pl. 3:1540, 1803; Roxb. Fl. Ind. ed. Carey 3:404, 1832.

Microrhynchus asplenifolius (Willd.) DC. Prodr. 7:81, 1838.

Annual erect herb, multicauline, glabrous, latex white. **Leaves** in a rosette, obovate, oblanceolate, lyrate pinnatifid; lobes minutely toothed. **Flowering** shoots many, paniculately branched, leafless. **Heads** in terminal clusters, peduncles short. **Flowers** all ligulate, yellow. **Anthers** bases saggitate. **Achenes** oblong, angled and ribbed; ribbs hairy. **Pappus** multiseriate, white.

Common in cultivated and fallow fields especilly in dry gravelly soil.

Flowering & Fruiting: Cold season.
Siddiqui 31989, Inspection House.

2. **Launaea fallax** (Jaub. et Spach) O. Kuntze, Rev. Gen. Pl. 1:351, 1891; Kitamura, Fl. Afghan. 431, 1960; Suppl. FUGP. 124, 1976.

Microrhynchus fallax Jaub. et Spach, I 11. Orient. 3:106. t. 276, 1875.

Launaea nudicaulis (Linn.) Hook. f. in FBI. 3:416, 1881; FUGP. 1:450, Repr. ed. 1960.

Chondrilla nudicaulis Linn. Mant. 273, 1767.

Differs from the preceding species in its larger size; yellow

latex and flowers arranged racemosely on flowering branches.

Abundant, found in agricultural fields, waste land and on road sides.

Flowering & Fruiting: Cold season.

Siddiqui 31585, Chak.

28. Sonchus Linn.

Key to species:

Leaves spinescent; achenes not transversely rugose .....1. *S. asper*

Leaves not spinescent; achenes transversely rugose .....2. *S. oleraceus*

1. Sonchus asper (Linn.) Hill, Brit. Herb. 47, 1756; Garsaut, Fig. Pl. Anim. Med. 4:332. t. 565, 1764; FBI. 3:414, 1881; FUGP. 1:448, Repr. ed. 1960; Boulos, Bot. Nat. 113:412, 1960; Jeffery in Kew Bull. 18:481, 1967; HFDD. 281, 1977.

Sonchus oleraceous var. *asper* Linn. Sp. Pl. 794, 1753.

An erect and stout annual herb. **Stem** fistular, tinged with purple, glabrous, sometimes grandular above. **Leaves** basal, in a rosette, ovate, oblong, runcinate-pinnatifid, tooth spinescent; semiamplexicaul auricles rounded, appressed. **Heads** in compact terminal corymbs. **Involucral bracts** glabrous or with few glandular hairs. **Flowers** all ligulate, yellow. **Achenes** compressed faces-3-ribbed. **Pappus** copious, white.

Common in waste lands, roadsides ditches, field and on old walls.

Flowering & Fruiting: Cold season.

Siddiqui 31197, Khera.

2. Sonchus oleraceous Linn. Sp. Pl. 794, 1753; FBI. 3:414, 1881; FUGP. 1:488, Repr. ed. 1960; Boulos, Bot. Not. 113:412, 1960; HFDD. 282, 1977.

Differs from the above species in being relatively flaccid; leaves fewer, broader, darker in colour and without any spine. **Achenes** 3-ribbed and transversely rugose.

Abundant within the area.

Ethnobotanical uses:

The plant is used as a laxative and emollient drink in chronic affections of the digestive organs.

Flowering & Fruiting: February-May.

Local Name: 'Dodhi-gobhi'

Siddiqui 31198, Khera.

29. Cichorium Linn.

Cichorium intybus Linn. Sp. Pl. 813, 1753; FBI. 3:391, 1881; Suppl. FUGP. 107, 1976; HFDD. 253, 1977.

An erect or pubescent branched herb. **Stem** terete, faintly ribbed, hispid. **Leaves** subsessile or sessile, spathulate, coarsely dentate, sparsely hairy on both the surfaces. **Heads** in clusters. **Involucral bracts** 2-seriate; outer gland pubescent; inner glabrous. **Corolla** ligulate, blue. **Achenes** turbinate, obscurely 5-angled, light brown. **Pappus** scaly, white.

Common in *Trifolium alexandrinum* (Barseem) fields.

Ethnobotanical use:

Juice of the plant applied externally in inflammatory portions.

Flowering & Fruiting: February-May.

Local Name: 'Kasni'

Siddiqui 31231, Kundouli.

30. **Xanthium** Linn.

Xanthium strumarium Linn. Sp. Pl. 987, 1753; FBI. 3:303, 1881; FUGP. 1:426, Repr. ed. 1960; Widder, Fedde Repert. Beih. 20:1-221, 1923; HFDD. 290, 1977.

An erect, simple or branched, shrubby, scabrid herb. Stem terete, rough, often blotched with purple. **Leaves** long petioled, palmately 3-5 lobed, coarsely dentate, cuneate. **Flowers** male and female, flowers in different heads; heads fascicled or solitary. **Female heads** short peduncled. **Involucral bracts** 2-3 seriate, linear, acute, ciliate. **Corolla greenish, hairy. Fruits** hard, covered with hooked spines and a pair of larger hooks at the tip.

Abundant, on road sides and waste places.

Ethnobotanical uses:

The plant is astringent, emollient, sedative, diuretic and anti-scrophulous. Its decoction is given in malarial fever, leucorrhoea, menorrhagia and urinary troubles.

Flowering & Fruiting: July-January.

Local Name: 'Chota-gokhru'

Siddiqui 31166, Bhaseta.

31. **Echinops** Linn.

Echinops echinatus Roxb. Hort. Beng. 62, 1814; FBI. 3:358, 1881; FUGP. 1:437, Repr. ed. 1960.

Erect, much branched, rigid, annual herb. **Stem** and branches terete, more or less ribbed, lobes triangular, sinuately spinescent, spines, sharp, brown, under surface cottony-tomentose along veins mixed with white bulbous tipped hairs. **Heads** 1-flowered arranged in terminal globose balls. **Involucral bracts** spiny. **Corolla** tubular, 5-cleft, dirty white or purplish blue. **Anthers** bases sagittate. **Achenes** dark brown or black, obconic, silky villous, surrounded by the hardened inner bristly involucral bracts.

Ethnobotanical use:

The plant is used as tonic and diuretic.

Flowering & Fruiting: March-June.

Local Name: 'Utkatra'

Siddiqui 31273, Mama purva.

32. **Sphaeranthus** Linn.

Sphaeranthus indicus Linn. Sp. Pl. 927, 1753; FBI. 3:275, pro parte; Ross-Craig, Hook. Ic. Pl. Ser. 5. 6:20, 1954; FUGP. 1:419, Repr. ed. 1960; HFDD. 283, 1977.

A much branched ascending, hairy annual herb, prostrate, decumbent. **Leaves** sessile, obovate, oblong narrowed to the base, obtuse or subacute and usually with long bristle at the tip, dentate or serrate; the teeth often bristle pointed, hairy on

both surfaces (not glandular hairy). **Heads** a cluster of numerous closely packed capitula. **Involucral bracts** shorter than the heads, ciliate at the apex. **Flowers** purple-red. **Pappus** none. **Achenes** stalked, smooth.

Common in dry ditches and uncultivated paddy fields.

Ethnobotanical uses:

Shade dried leaves powder is given in chronic skin diseases. The flowers alterative, depurative, refrigerant and tonic. Root powder is used with honey as an anthelmintic, stomachic and in cough.

Flowering & Fruiting: October-May.

Local Name: 'Mundi'

Siddiqui 31545, Sadai behta.

33. Elephantopus Linn.

Elephantopus scaber Linn. Sp. Pl. 814, 1753; FBI. 3:242, 1881; FUGP. 1:404, Repr. ed. 1960; HFDD. 261, 1977.

Erect, rhizomatous, dichotomously branched scabrid herb. **Stem** cylindric, rigid. **Leaves** mostly redical, obovate, oblong, narrowing to base, crenate; dorsoventrally scabrid; cauline leaves few, much small, sessile or very shortly petioled. **Heads** many forming a flat topped corymb; surrounded at the base by 3-cordate foliaceous bracts; **Involucral bracts** linear, 8, biseriate, outer broad, inner narrow. **Corolla** 5-cleft, purple. **Pappus** of 4-5 bristles. **Achenes** hairy between ribs.

Found in grassy localities and on the edges of ravins.

Caesulia axillaris Roxb.

Ethnobotanical uses:

Decoction of roots and leaves are used with cumin in dysuria, diarrhoea and dysentery.

Local Name: 'Jangli-gobhi'

Siddiqui 31508, Bilgram Road.

34 Caesulia Roxb.

Caesulia axillaris Roxb. Pl. Cor. 1:64. t. 93, 1798; FBI. 3:291, 1881; FUGP. 1:422, Repr. ed. 1960; HFDD. 248, 1977.

An ascending annual marshy herb; lower nodes often rooting. **Stem** streaked, brownish, glabrous. **Leaves** serrate, lanceolate, acute, glabrous, base semiamplexicaul, sheathing. **Heads** globose, compound, 3-4 connate together in a compound head. **Involucral bracts** 2-3 seriate; outer broad, acuminate, denticulate; inner linear; upper part of the involucral bracts tinged with or violet. **Corolla** lobes glabrous. **Anthers** dark brown, exserted. **Achenes** dark brown, obovoid, ribbed, winged. **Pappus** scales 2, ovate-lanceolate.

Common, mostly in rice fields and on the marshy margins of the ditches.

Flowering & Fruiting: September-April.

Siddiqui 31495, Sadai behta.

The following plants are commonly cultivated in gardens and often found as an escape.

1. *Helianthus annuus* Linn. Sp. Pl. 904, 1753.

An erect robust shrub. **Leaves** ovate to ovate-oblong, hispidulous

on both surfaces. **Heads** heterogamous, very large, yellow. **Achenes** oblong-obovoid, strw coloured with blackish streaks.

Flowering & Fruiting: December-May.

Local Name: 'Suraj-mukhi'

Siddiqui 31967, Tara Academy.

2. *Calendula officinalis* Linn. Sp. Pl. 921, 1753.

An erect, aromatic, viscid, small annual herb. **Leaves** spatulate-obovate with a semi-amplexicaul base, glabrate or glandular hairy. **Heads** yellow or orange. **Achenes** oblong, curved, warty.

Flowering & Fruiting: February-May.

Siddiqui 31927, Collectrate.

3. *Centaurea cyanus* Linn. Sp. Pl. 911, 1753.

Erect, cottony annual herb. **Leaves** spathulate-lyrate, upper ones linear-lanceolate, entire, glabrous above, cottony beneath. **Heads** white to pink or violet on cottony peduncles. **Anthers** dark violet. **Achenes** thinly pubescent.

Flowering & Fruiting: February-May.

Siddiqui 31987, Inspection House.

4. *Cosmos sulfurious* Cav. Ic. Descr. Pl. 1:56. t. 78, 1791; Sherff, Field Mus. Nat. Hist. Bot. Ser. 7:401-447, 1932.

Erect, much branched, aromatic annual herb. **Leaves** 2-3 pinnati-partite or pinnatae; segments lanceolate-oblong, apiculate, entire, glabrescent or glabrous, petioled. **Heads** solitary yellow. **Achenes** fusiform, 4-angular, especially awned.

Flowering & Fruiting: September-December.

Siddiqui 31988, Inspection House.

LIX. CAMPANULACEAE

Key to Genera:

A nearly glabrous herbs; corolla white or pale violet; capsule obconical glabrous ..... *1. Wahlenbergia*

A pubescent herb; corolla pale purple or lilac; capsule hemispheric hispidly hairy ..... *2. Campanula*

1. **Wahlenbergia** Schrad. ex Roth, nom. cons.

Wahlenbergia marginata (Thunb.) DC. Monogr. Camp. 143, 1830; Prodr. 7:433, 1839; Moeliono & Tuyan, Fl. Male. Ser. 1. 6:115, 1960; HFDD. 295, 1977.

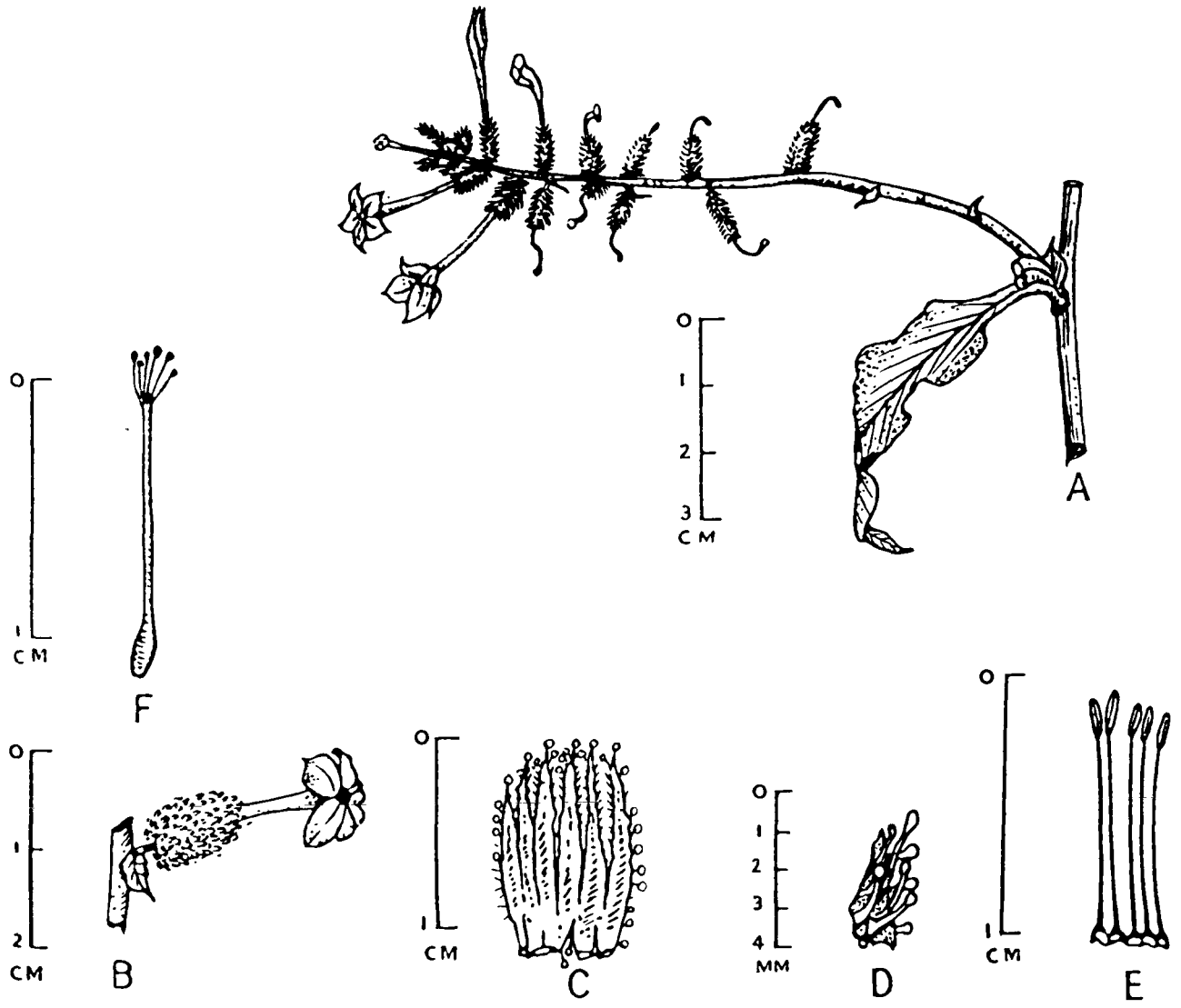
Campanula marginata Thunb. Fl. Jap. 89, 1784.

Campanula gracilis Forst. Prodr. 15, 1786.

Wahlenbergia gracilis (Forst.) DC. Monogr. Camp. 142, 1830; Prodr. 7:433, 1839; FBI. 3:429, 1881; FUGP. 1:453, Repr. ed. 1960

Erect ascending, nearly glabrous annual herb, sometimes slightly hairy in lower portion. **Stem** simple or divaricately branched from the base. **Leaves** sessile, linear to obovate-oblong, more or less toothed; each tooth with a white spot at the apex; margins often thickened or undulate. **Flowers** in lax cymose penicles; pedicel long and slender; upper bracts linear, acute. **Calyx** tube turbinate, lobes acute, triangular, erect in fruit, persistent. **Corolla** campanulate, divided half way down, the tube into broad,

Plumbago zeylanica Linn.
A. Flowering twig, *B.* Flower, *C.* Calyx, *D.* Enlarged calyx showing glandular hairs, *E.* Stamens, *F.* Carpel.



Plumbago zeylanica Linn.

Occassionally found on walls of old buildings and bank of the river.

Flowering: January-May; **Fruiting:** April-June.

Siddiqui 31274, Mama purva.

Plant associated: *Evolvulus alsinoides*, *Evolvulus nummularius*, *Fimbristylis* sps., *Trichodesma indicum* etc.

LX. SPHENOCLEACEAE

Sphenoclea Gaertn., nom. cons.

Sphenoclea zeylanica Gaertn. Fruct. 1:113. t. 24. f. 5, 1788; FBI. 3:438, 1881; FUGP. 1:454, Repr. ed. 1960; Airy Shaw, Fl. Males. Ser. 1. 4:27, 1948; HFDD. 295, 1977.

Erect, simple or branched annual herb. **Stem** terete, fistular, with a peripheral whorls of air channels. **Leaves** simple, oblong-lanceolate. **Flowers** in terminal compact erect spikes, bracteate and bracteolate. **Petals** white, 5, connate, campanulate; lobes arbicular to acute. **Stamens** 5, free, epipetalous; filaments short. **Ovary** inferior, 2-celled; ovules numerous; style 1; stigma obscurely 2-lobed. **Fruit** a circumscissile capsule. **Seeds** numerous, minute, light brown.

Commonaly found on marshy situations.

Flowering: August-September; **Fruiting:** October-November.

Siddiqui 31469, Gulamau.

LXI. PLUMBAGINACEAE

Plumbago Linn.

Key to species:

Flowers white .....*1. P. zeylanica*

Flowers pale-blue.....*2. P. auriculata*

1. **Plumbago zeylanica** Linn. Sp. Pl 151, 1753; FBI. 3: 506, 1882; FUGP. 1:461, Repr. ed. 1960; Van Steenis, Fl. Male. Ser. 1. 4:109, 1949; HFDD. 296, 1977.

Erect perennial shrub, branches often rambling. Stem slightly woody at base. Leaves simple, alternate, ovate-oblong, petioled amplexicual and auricled. Flowers in terminal or axillary spicate racemes; bracts foleaceous. Calyx sepals 5, tubular, gland pubescent, viscid. Petals 5, gamopetalous, tube long, lobes spreading at length, white. Stamens 5. Ovary 1-celled, glabrous; style 1; stigmatic rays 5. Fruit a capsule, oblong enclosed in calyx tube.

Often found near villages.

Ethnobotanical uses:

The plant is used as digestive, light astringent hot and appetizing, dyspepsiya, piles, leprosy, anasarca, worm, cough and phlegm. Juice of the root is used in blisters of the skin. The root is stimulent, diaphoretic, stomachic, abortifacient and vasicant. Powder of root is given in diarrhoea, piles, rheumatism and skin diseases. Root barf is introduced into the mouth of the womb for abortion.

Flowering: May-November; **Fruiting:** December-February.

Local Name: 'Chitrak'

Siddiqui 31370, Hasia.

2. **Plumbago auriculata** Lamk. Encycl. 2:270, 1786; van Steenis, Fl. Males, Ser. 1. 4:111, 1949; HFDD. 249, 1977.

Plumbago capensis Thunb. Prodr. Fl. Cap. 33, 1794.

This taxon is easilly distinguishable from the former by its spreading or straggling habbit, too large stipuloid auricles of the petiole, shorter racemes and bluish flowers.

Occasionally planted in pots as an ornamental flowers.

Siddiqui 31915, S.P. Lodge.

Flowering: May-November; **Fruiting:** December-February.

Local Name: 'Chitrak'

Siddiqui 31370, Hasia.

2. **Plumbago auriculata** Lamk. Encycl. 2:270, 1786; van Steenis, Fl. Males, Ser. 1. 4:111, 1949; HFDD. 249, 1977.

Plumbago capensis Thunb. Prodr. Fl. Cap. 33, 1794.

This taxon is easilly distinguishable from the former by its spreading or straggling habbit, too large stipuloid auricles of the petiole, shorter racemes and bluish flowers.

Occasionally planted in pots as an ornamental flowers.

Siddiqui 31915, S.P. Lodge.

LXII. PRIMULACEAE

Key to Genera:

Corolla-lobes imbricate. Leaves in a basal rosette. Flowers in one or more superposed whorls .....*1. Primula*

Corolla-lobes contorted. Leaves cauline. Flowers not in whorls .....*2. Anagallis*

1. **Primula** Linn.

Primula umbellata (Lour.) Bentv. in Fl. Males. (Ser. 1). 6:191, 1962; HFDD. 300, 1977.

Drosera umbellata Lour. Fl. Cochinch. 186, 1790.

Androsace saxifragifolia Bunge in Mem. Acad. Sci. Petersb. 2:127, 1835; FBI. 3:496, 1882; FUGP. 1:460, Repr. ed. 1960.

Androsace umbellata (Lour.) Merr. Philip. Journ. Sci. 15:237, 1919; Enum. Philip. Flow. Pl. 3:27, 1923; Hand. -Mazz. Notes Roy. Bot. Gard. Edinb. 60:112, 1928.

A glandular-pubescent, scapigerous, slender annual herb. **Leaves** patioled in basal rosette, arbicular or subreniform, base cordate or subtruncate, crenate. **Scapes** many, much longer than the leaves, glandular hairy. **Flowers** in 3-6 flowered umbels; pedicles unequal. **Calyx** deeply 5-cleft, slightly acrescent. **Corolla** white, throat narrow; lobes obtuse. **Capsule** globose.

Common, prefers shaddy and humid situations.

Flowering: December-February; **Fruiting:** March-May.

Siddiqui 31586, Chak.

Plant associated: *Salvia anthemifolia*, *Gnaphalium indicum*, *Phyllanthus fraternus*, *Euphorbia perviflora* etc.

2. **Anagallis** Linn.

Anagallis arvensis Linn. Sp. Pl. 148, 1753; FBI. 3:5Ø6, 1881; FUGP. 1:481, Repr. ed. 196Ø; HFDD. 297, 1977.

Erect or decumbent-ascending annual herb, branching from the base. **Stem** 4-angled, narrowly winged. **Leaves** sessile, ovate-lanceolate to oblong, obtuse or subacute, entire, glabrous. **Flowers** solitary, axillary, pedicelled; the pedicle elongates as fruit matures and become decurved; violet or pink in colour. **Petals** slightly coherent at the base, **margins fringed. Stamens** 5, filaments covered with purple, moniliform hairs, 7-9 celled. **Capsule** globose, circumcissile.

Commonaly found within the area.

Flowering: November-February; **Fruiting:** March-May.

Siddiqui 31558, Baturi purva.

Plants associated: *Stellaria media*, *Silene conoidea*, *Vicia hirsuta*, *Asphodelous tenuifolius* etc.

LXIII. MYRSINACEAE

Embelia Burm.

Embelia robusta Roxb. Hort. Beng. 16, 1814; FBI. 3:515, 1881; FUGP. 1:463, Repr. ed. 1960; Ind. Tr. 416, Repr. ed. 1971.

A large rambling shrub or small tree. **Branches** stout, lanticellate, younger parts densely rusty-tomentose. **Leaves** alternate, simple, membranous, gland-dotted, obovate or broadly elliptic, entire, serrulate, acuminate, glabrous above, stellately pubescent beneath. **Flowers** 5-merous, greenish-yellow, small, polygamous, in axillary or terminal pubescent racemes, often fascicled. **Sepals** 5, free, persistent, slightly connate at base, ovate, margined gland-ciliate. **Petals** 5, free, slightly basally, connate, double the calyx length, oblong and reflexed with black-gland-dots. **Stamens** 5, adnate to the base of petals; anthers minutely apiculate. **Ovary** 1-celled, superior. **Style** short persistent. **Fruit** globose berry, dry and indehiscent, red when riped, with many longitudinal furrows; seed 1, albuminous.

Commonaly found within the area in open forest.

Flowering: July-September; **Fruiting:** October-December.

Siddiqui 31413, Madia.

LXIV. SAPOTACEAE

Key to Genera:

Calyx-lobes and staminodes 6-8; flowers solitary or few within leaf - axils:

Flowers 4-merous .....*1. Mimusops*

Flowers 5-merous .....*2. Manilkara*

Calyx-lobes 4-5; staminodes none;flowers in fascicles near the ends of branches .....*3. Madhuca*

1. **Mimusops** Linn.

Mimusops elengi Linn. Sp. Pl. 349, 1753; FBI. 3:548, 1882; FUGP. 1:467, Repr. ed. 1960; FPP. 152, 1978.

A medium sized tree with dense canopy and dark grey, longitudinally fissured bark. **Leaves** elliptic-ovate, subcoriaceous margins slightly undulate. **Flowers** axillary, fescicled, fragrant, creamy-white; pedicels often recurved. **Sepals** 8, 2-seriate, connate at base. **Petas** 8, connate, seemingly 24 due to 2 petioloid appendages on each lobe. Creamy-white turning to brownish. **Stamens** 8, alternating with 8 staminodes. **Ovary** pubescent, 8-celled; style short. **Fruit** ovoid berry, yellow or orange, 1-2 seeded.

Often planted in gardens and mosques.

Ethnobotanical uses:

Powder of dried flowers mixed with faththa (*Acacia nilotica* bark) and are used in mouth blisters and snuff to relieve headache. Decoction of bark is given in bladder and urethera as an

astringent and in fever. The decoction is a useful mouthwash in diseases of gum and teeth and excessive salivation.

Flowering: March-August; **Fruiting:** December-February.

Local Name: 'Mulsary'

Siddiqui 31287, Hardoi.

2. **Manilkara** Adans.

Manilkara hexandra (Roxb.) Durb. in Ann. Mus. Col. Marseille (Ser. 3.) 3:9, 1915; Baehni in Biossiera 11:92, 1965; FPP. 152, 1978.

Mimusops hexandra Roxb. Pl. Cor. 1:16. 15, 1795; FBI. 3:549, 1882; FUGP. 1:467, Repr. ed. 1960.

A medium sized tree. **Bark** dark-brown, deeply longitudinally fissured. **Leaves** elliptic-oblong, glabrous, obtuse to emarginate, coriaceous. **Flowers** axillary fascicled, creamy-white turning to pale-brown later. **Sepals** 6, connate, 2-seriate, rusty tomentose. **Petals** 6, connate, each corolla lobe with 2 appendages making the corolla 18-lobes apparantely. **Stamens** 6, alternating with 6 staminodes. **Ovary** pubescent, 12-celled. **Fruit** oblong-berry, golden-yellow or orange-red when ripe.

Planted in garden and on road sides.

Flowering: November-January; **Fruiting:** April.

Siddiqui 31553, Hardoi.

3. **Madhuca** Gmel.

Madhuca indica Gmel. Syst. Nat. 2:799, 1791; Santapau in Rec. Bot. Surv. Ind. 16(3):141, 1967.

Bassia latifolia Roxb. Pl. Cor. 1:20, t. 19. 1795; FBI. 3:544, 1882; FUGP. 1:465, Repr. ed. 1960.

Madhuca latifolia (Roxb.) Macbride in Contr. Gray. Her. (n. s.) 53:18, 1918.

A large deciduous tree. **Bark** greyish-brown to dull black longitudinally fissured. Young parts rusty-tomentose. **Leaves** clustered at the ends of branchlets, elliptic-ovate to oblong, reddish when young, later cream and coriaceous, shortly acuminate, glabrous both surfaces; petioled. **Flowers** creamy-white, sweet-scented, drooping in fascicles on rusty-villous shoots. **Sepals** 4, connate, rusty-tomentose. **Petals** 8-9, upto 14, elliptic, connate-flushy, sweet, edible, corolla urceolate. **Stamens** 20-30; filaments short, anthers with pointed apex, villous. **Ovary** 6-8 celled; style 1, persistent. **Fruit** a berry, ovoid, fleshy, 1-4 seeded.

A common tree of the open forest, also cultivated along the road sides.

Ethnobotanical uses:

Leaves boiled with black pepper and its decoction taken orally with common salt in case of cough and fever. The flowers are cooling, tonic, nutrietive, expectorant and demulcent. The bark is astringent and tonic its decoction is given in diabetes and rheumatic disease. Oil is used in skin diseases.

Flowering: March-April; **Fruiting:** June-July.

Local Name: 'Mahua'

Siddiqui 31261, Bilgram Road.

LXV. EBENACEAE

Diospyros Linn.

Diospyros cordifolia Roxb. Pl. Cor. 1:38. t. 50, 1795; FUGP. 1:471, Repr. ed. 1960; FPP. 152, 1978.

Diospyros montana Clarke in FBI. 3:555, 1882 (pro parte).

A small crooked tree, with dark grey bark. **Leaves** alternate, oblong, lanceolate, acuminate, cordate, hairy. Male flowers in 3-flowered peduncled cymes, bracteate. **Sepals** 4, basally connate, hairy. **Petals** 4, tube campanulate. **Stamens** not consistent in number, usually 16 in 6-8 pairs inserted at different labels. Females flowers solitary, axillary, bracteate. **Staminodes** often present 8-12. **Ovary** 6-8 celled; style 4. **Fruit** a yellow to orange-yellow berry, with persistent acrescent calyx lobes. The sap of fruit, when exposed to air, turns brwon.

Planted in gardens and avenues.

Flowering & Fruiting: March-August.

Siddiqui 31984, Shaheed Udyan.

LXVI. OLEACEAE

Key to Genera:

Young brnches cylindrical; leaves smooth; corolla without orange red tube.....*1. Jasminum*

Young branches 4-angled; leaves scabrid; corolla with orange red tube .....*2. Nyctanthes*

1. **Jasminum** Linn.

Key to species:

leaves simple.

Flowers in 3-5 flowered cymes .....1. *J. sambac*

Flowers in many flowered cymes .....2. *J. multiflorum*

Leaves imparipinnate; calyx tube minute .....3. *J. auriculatum*

1. **Jasminum sambac** (Linn.) Ait. Hort. Kew 1:8, 1789; Bor & Raizada Beaut. Ind. Cl. & Sh. 218. f. 128, 1954; Fl. Delhi 208, 1963; FPP. 154, 1978.

Nyctanthes sambac Linn. Sp. Pl. 6, 1753.

A scandant shrub. **Leaves** oval-ovate, entire. **Flowers** in 3-5 flowered, terminal cymes. **Calyx** lobes 7-10, filiform. **Corolla** segments 8-numerous, lower half fused to form a tube, white in colour, fragrant. **Fruit** not observed.

Cultivated in parks and private gardens.

Flowering: June-November.

Siddiqui 31955, Bal Vidhya Mandir.

2. **Jasminum multiflorum** (Burm. f.) Andr. Bot. Rep. 8. t. 496, 1807; Fl. Delhi 208, 1963.

Nyctanthes multiflora Burm. f. Fl. Ind. 5. t. 3. f. 1, 1768.

Jasminum pubiscence Willd. Sp. Pl. 1:37, 1797; FBI. 3:592, 1882; Bor & Raizada Beaut. Ind. Cl. & Sh. 219. f. 129. Pl. 78, 1954.

A subscandent shrub; branches drooping. **Leaves** ovate-lanceolate, pubescent. **Flowers** in axillary, many flowered cymes, hetero-stylous. **Calyx** lobes 7-9, linear, filiform, pubescent. **Corolla** tube shorter than the calyx lobes; segments oblong-lanceolate, white. **Fruits** not seen in the area.

Cultivated in gardens and parks.

Flowering: July-September; January-April.

Siddiqui. 31948, Hardoi.

3. **Jasminum auriculatum** Vahl, Symb. Bot. 3:1, 1794; Fl. Delhi 208, 1963.

A scandent or twinning shrub; young branches densely pubescent. **Leaves** 3-foliate; the lateral leaflets reduced to auricles. **Flowers** in terminal cymes, star-shaped, white, fragrant. **Calyx** tube minute or obsolete. **Fruit** a globose berry, balck when ripe.

Cultivated in gardens on poles and pergolas.

Flowering & Fruiting: July-December.

Siddiqui 31934, Hardoi.

2. **Nyctanthes** Linn.

Nyctanthes arbor-tristis Linn. Sp. Pl. 6, 1753; FBI. 3:603, 1882;

Fl. Delhi 279, 1963; FUGP. 477, Repr. ed. 1960; FPP. 154, 1978.

A small tree. young branches 4-angled. Leaves ovate-oblong, scabrid. Flowers in terminal cymes. Corolla tube orange-yellow; limb white. Fruit a compressed, orbicular capsule, splitting into 2, flat, 1-seeded pyrenes.

Largely cultivated in gardens and houses for its fragrant flowers.

Ethnobotanical uses:

Leaves are expectorant, anthelmintic and laxative. Juice of the leaves is given with honey in malarial fever. Decoction of the bark is used as expectorant. The powdered seeds are used as a dust for scaly diseases of the scalp.

Flowering & Fruiting: September-January.

Local Name: 'Harsingar'

Siddiqui 31962, Homoeopathic Hospital.

A systematic position of this taxon has long been a point of controversy among the systematic botanist. Different authors have placed it in different families (OLEACEAE, VERBENACEAE and NYCTAGINACEAE). Ruthkiew and Pietar Bass (1984) have critically examined the habit, floral morphology, fruit and seed, stem anatomy, leaf anatomy, indumentum, stometa, foliar sclereids, crystals, petioles, flower vasculature, embroylogy, pollen, chromosome number and phytochemistry of *Nyctanthes* and compared with other members of OLEACEAE. These attributes of *Nyctanthes* were found compatible with accomodation of the genus in the family OLEACEAE.

LXVII. APOCYNACEAE

Key to Genera:

Erect herb or small shrub:

Flowers solitary or in pairs; fruit a follicle, dehescent ..... 1. *Catharanthus*

Flowers in peduncled cymes; fruit a drupe, indehescent ..... 2. *Rauvolfia*

Climbing shrubs or linans:

Flowers in lax dichotomous cymes; anthers exerted ..... 3. *Vallaris*

Flowers incompact trichotomous cymes; anthers included ..... 4. *Ichnocarpus*

Large erect shrub and trees:

Plants armed with spines; shrubs.

Flowers in peduncled cymes; fruit a berry ..... 5. *Carissa*

Plants unarmed; generally trees:

Leaves whorled; calyx without glands ..... 6. *Alstonia*

Leaves opposite; calyx with glands inside at the base:

Corolla without corona ..... 7. *Holorrhena*

Corolla with a corona ..... 8. *Wrightia*

1. **Catharanthus** G. Don

Cathranthus pusillus (Murr.) G. Don, Gen. Syst. 4:95, 1836; HFDD. 3Ø1, 1977; FPP. 157, 1978.

Vinca pusilla Murr. in Comm. Soc. Rec. Sci. Gotting. 3:66. t. 2. f. 1, 1773.

Lochnera pusilla K. Schum. in Engl. & Prantl, Nat. Pflanzenfam. 4(2):145, 1895; FUGP. 1:485, Repr. ed. 196Ø.

An erect, glabrous branched or unbranched annual herb. **Stem** acutely 4-lobed. **Leaves** opposite; **stipules** dissected; leaf surface glabrous with transverse hyaline margins (as seen under microscope); margins ciliate; apex acute; lateral 5-6. **Flowers** solitary-axillary, short pedicelled, white. **Calyx** sepals 5, slightly connate at base; segments linear, acute, persistent. **Corolla** petals 5, cream coloured; throat with scales. **Stamens** 5, inserted near the throat; anthers acute, free from stigma. **Seeds** black, longitudinally muricate and longitudinally furrowed on one side.

Commonaly found among the thickets along road sides and waste lands.

Flowering & Fruiting: Rainy seasons.

Siddiqui 31414, Madia.

2. **Rauvolfia** Linn.

Rauvolfia serpentina Benth. ex Kurz., For. Fl. Brit. Burm. 2:171, 1877; FBI. 3:632, 1882; FUGP. 1:484, Repr. ed 196Ø; Sulochna Journ. Ind. Bot. Soc. 38:578, 1959; HFDD. 3Ø2, 1977.

Glabrous, erect, perennial, suffruticose herb or under shrub. Leaves whorled, lanceolate or oblanceolate, tapering into a short patiole. Flowers white or pinkish in corymbose cymes; pedicels very short and red. Bracts minute, lanceolate. Calyx deeply 5-partite; lobes oblong-lanceolate, edge red. Corolla salver-shaped, tube dilated about the middle over the stamens, lobes 5, elliptic-oblong, white tinged with pink. Stamens included; filaments very short; anthers dorsifixed. Carpels 2; style connate; stigma broad, discoid, 2-fix. Drupe purplish-black, single or didymous.

Commonaly found in cool and shady situations.

Ethnobotanical uses:

Decoctions of the roots are used in snake bite and scorpion bite. It is also given in diarrhoea and dysentery. Powder of the root is applied externally affected portion of snake bites and bowels.

Flowering: May-June; **Fruiting:** July-September.

Local Name: 'Serp gandha'

Siddiqui 13343, Chhatouri.

3. **Vallaris** Burm.

Vallaris solanacea (Roth.) Kuntze, Rev. Gen. 2:417, 1891; Bor. Man. Ind. For. Bot. 284, 1953; Fl. Delhi 112, 1963; FPP. 159, 1978.

Peltanthera solanaceae Roth. Nov. Pl. Sp. 132, 1821.

Vallaris heynei Spreng. Syst. 1:635, 1824; FBI. 3:650, 1882; FUGP. 1:488, Repr. ed. 1960.

A large, glaucous, twinning shrub. **Leaves** opposite, oblong-lanceolate, glabrous, punctate. **Flowers** white in axillary, dichotomous cymes. **Stamens** 5, forming a cone; each anther with a globular gland at the back. **Fruit** not seen.

Often found in open forest.

Flowering: February-April.

Siddiqui 31245, Chhatouri.

4. **Ichnocorpus** R. Br.

Ichnocorpus frutescens (Linn.) R. Br. in Mem. Wern. Soc. 1:62, 18Ø9; FBI. 3:669, 1882; FUGP. 1:492, Repr. ed. 196Ø; FPP. 157, 1978.

Apocynum frutescenes Linn. Sp. Pl. 213, 1753.

A twinning evergreen, branched shrub; inflorescence and abaxial surface of the leaves ferruginous. **Leaves** elliptic-oblong or ovate-lanceolate, acute or accuminate, dark shinning green above and rusty beneath; main lateral nerves 4-5 pairs. **Flowers** white, fragrant in dense cymes. **Calyx** rusty, minutely glandular inside. **Sepals** ovate, acute and fused halfway. **Corolla** salver shaped, lobes ovate-lanceolate, twisted, swollen round the included anthers, hairy on upper surface. **Stamens** 5; anthers sagittate, connivent above and adherent to stigma. **Disk** lobed; lobes longer than the hairy ovary, tips of the lobes swollen. **Fruits** paired follicles, rusty.

Common, often found climbing on *Flacourtia*, *Zyziphus* and *Dalbergia*.

Ethnobotanical use:

Decoction of the fresh roots are given to the patient of snake bite.

Flowering: August-November; **Fruiting:** February-April.

Local Name: 'Hansa ki bel'

Siddiqui 31435, Kahoura.

5. Carissa Linn.

Carissa spinarum Linn. Mant. 559, 1771; FBI. 3:631, 1882; Ind. Tr. 455, Repr. ed. 1971, Gamble Man. Ind. Timb. 480.

Carissa opaca Satpf. ex Haines in Ind. For. 47:378, 1921; Parker, For. Fl. of Punjab ed. 2:330, 1924.

A large evergreen thorny shrub, with numerous rigid, zig-zag branchlets armed with simple or forked thorns. **Leaves** opposite, broadly ovate to elliptic, coreacious, glabrous, shining above. **Flowers** white, fragrant in few flowered corymbose cymes. **Sepals** 5, basally connate, lanceolate, ciliate. **Petals** 5, connate, corolla tube 0.8-1.0 cm long, salver-shaped, lobes oblong-lanceolate, contorted, white often pinkish tinged. **Stamens** 5; filaments very short; anthers free from stigma, apiculate. **Ovary** 2-celled; style filiform. stigma minutely 2-fid. **Fruit** an ellipsoid berry, black and filled with purple pulp when riped. **Seeds** 2, concave-convex or peltate.

Very common on road sides near the villages in dry situations.

Flowering: April-June; **Fruiting:** September-December.

Siddiqui 31378, Baturi purva.

6. **Alstonia** R. Br.

Alstonia scholaris (Linn.) R. Br. in Mem. Vern. Soc. 1:75, 1810; FBI. 3:642, 1882; FUGP. 2:34, Repr. ed. 1973; Fl. Delhi 215, 1963.

Echites scholaris Linn. Mant. 55, 1767.

A large evergreen tree with buttressed trunk; bark grey somewhat rough and lanceolate. Leaves 4-7 verticellate, oblanceolate or elliptic-obling, coriaceous, glossy, glabrous above, glaucous beneath. Flowers greenish-yellow in compact, umbecellate cymes; pedicels very short. Calyx small, pubescent, 5-lobed; lobes ovate, twisted. Disk absent; anthers acute. Ovary villous. Fruit a follicle 20-40 cm long, terete, pendullous. Seeds flattened, tuft of hairs on both ends.

Occasionally found in the mixed deciduous forest.

Ethnobotanical uses:

Bark of the stem mixed with Tinospora cordifolia and Azadirachta indica bark and make decoction, is used in boils and other skin diseases. Bark mixed with black pepper and are used in dyspepsia, rheumatic joints, astringent, anthelmintic and antiperiodic. Juice of the bark is used with milk in case of leprosy. Juice of the leaves is given with ginger to the women after child birth. Decoction of the bark is also given in diarrhoea and dysentery.

Flowering: November-January; **Fruiting:** April-July.

Local Name: 'Chhatian'

Siddiqui 31547, Hasia.

7. **Holorrhena** R. Br.

Holorrhena antidysenterica (Linn.) Wall. Cat. 1672, 1829, nom. nud.; G. Don, Gen. Syst. 4:78, 1837; FBI. 3:644, 1882; FUGP. 1:486, Repr. ed. 1960; Santapau in Rec. Bot. Surv. Ind. 16(1):167, 1953; Fl. Delhi 216, 1963.

Nerium antidysentericum Linn. Sp. Pl. 209, 1753.

A medium sized, deciduous tree. **Bark** rough, brown. Younger parts often pubescent. **Leaves** elliptic-oblong, subcoriaceous, subsessile, 10-16 nerved. **Flowers** white in terminal sessile, cymose, corymbs pedicelled. **Stamens** 5, at the base of the corolla tube; anthers mucronate. **Fruit** a white dotted, divaricate, double follicle.

Commonaly found within the area and often cultivated.

Ethnobotanical uses:

Bark is used as astringent, cold, digestive, piles, bile, leprosy, diarrhoea and also in urinary troubles, skin diseases, nausea and vomatting. Decoction of the bark is given in diarrhoea and dysentery.

Flowering: May-June; **Fruiting:** November-December.

Local Name: 'Indra jav'

Siddiqui 31554, Hardoi.

8. **Wrightia** R. Br.

Wrightia tomentosa Roem. & Sch. Syst. 4:414, 1819; FBI. 3:653, 1882; FUGP. 1:490, Repr. ed. 1960; Ind. Tr. Repr. ed. 1971.

A small deciduous tree with grey corky bark, exfoliating in

irregular small plates. Young parts softy tomentose. **Leaves** opposite, distichous, elliptic or elliptic-oblong, caudate-accuminate, obscurely sinuate or entire, subcoriaceous rather membranous, velvety tomentose. **Flowers** white turning yellow, rather foited, arranged in erect, terminal corymbose cymes. **Calyx** tomentose. **Corolla** white or tinged with pink turning to pale yellow, tube twice long as calyx, with an orange coloured corona of fleshy scales; lobes oblong, pepillose. **Stamens** inserted at top of corolla tube; filaments short and broad; anthers sagittate, basally spurred. **Fruit** of two connate follicles, 20-30 cm long, straight, laterally compressed, verrucose with white spikes; follicles separating before dehiscence.

Fairly common within the area.

Flowering: May-June; **Fruiting:** december-February.

Siddiqui 31371, Hasia.

The following plants are commonaly cultivated in the gardens and the parks:

1. **Catharanthus roseus** (Linn.) G. Don, Gen. Syst. 4:95, 1838; HFDD. 302, 1977; FPP. 157, 1978.

Vinca rosea Linn. Syst. (ed. 10), 944, 1759.

Lochnera rosea Reichb. Consp. Rec. Veg. 134, 1828.

This species widely cultivated and can be easilly distinguished from the *Catharanthus pusillus* by obtusely angled, somewhat woody stem; obtuse or rounded leaves and pink or white flowers.

Flowering: Round about the year.

2. Thevetia Linn., nom. cons.

Thevetia peruviana (Pers.) K. Schum. in Engl. & Prantl, Pflanzenfam. 4(2):159, 1895; Fl. Delhi 214, 1963; FPP. 158, 1978.

Cerbera peruviana Pers. Syns. 1:267, 1805.

Thevetia nerifolia Juss. ex Steud. Nom. 2:680, 1841.

A small evergreen tree. Leaves linear, lanceolate, sessile, subcoreaceous, glabrous, green; lateral nerves not prominent. Flowers in terminal cymes. Corolla campanulate, limb much longer than the tube; throat with 5 hairy scales. Fruit a depressed, globose angular drupe, green when young and black when ripe.

Ethnobotanical uses:

Leaves are boiled in water and bath taken to treat itching. The operation is repeated for 2-5 days or diseases is considered to be cured.

Flowering & Fruiting: Practically round the year.

Local Name: 'Kandail'

3. Carissa Linn.

Carissa congesta Wight, Icon. 1289, 1848; FPP. 156, 1978.

Carissa carandus auct. (non Linn.), FBI. 3:630, 1882 (Pro Parte); FUGP. 1:483, Repr. ed. 1960.

A large spreading shrub, branches armed with simple, straight spines. Leaves ovate-oblong, glabrous, shining. Flowers white or tinged with red in terminal, corymbose cymes. Fruit ellipsoid berry, creamy white with red shade when raw and purple-black when

mature. Seeds peltate, usually 4. This plant has a very sticky white latex which is particularly troublesome at the time of picking of berries.

Ethnobotanical uses:

The root is acrid and bitterish and is applied in the form of paste with lime juice and camphor as remedy for itching. Oil extracted from the seed is also used for the treatment of itches. Unripe fruit is digestive and an expellant of bilous and rheumatic humors.

Flowering: April-May; **Fruting:** June-August.

Local Name: 'Karonda'

4. Plumeria Linn.

Key to species:

Flowers red, golden yellow inside and red tinge outside .....1. *P. rubra*

Flowers white-creamy with a yellow centre.....2. *P. acuminata*

1. Plumeria rubra Linn. Sp. Pl. 209, 1753; Bailey Man. Cult. Pl. 810; Fl. Delhi 214, 1963.

A small crooked tree, 2-5 m tall; branches spraeding. Leaves oblong-lanceolate, short acuminate, coriaceous. Flowers in terminal long peduncled corymbs, red, golden-yellow inside, fragrant.

Ethnobotanical uses:

Milky juice as a rubefacient in rheumatic pains. Root bark is a

strong purgative and also a useful remedy of gonorrhoea and for venereal sores. Plasters made of the bark are said to be useful in dispersing hard tumours. The decoction of the bark is a powerfull antitherpeutic.

Flowering: August-November; **Fruiting:** Not observed.

Local Name: 'Khair-champa'

2. Plumeria acuminata Ait. Hort. Kew (ed. 2), 2:70, 1811; Merr. Enum. 3:321, 1923; FPP. 158, 1978.

Plumeria rubra Linn. forma *acutifolia* (Poir.) Woodson in Ann. Miss. Bot. Gard. 25:211, 1938; Benthall, Trees Calc. 304; Blatt. & Mill. Beaut. Ind. Trees, 112. t. 24; Fl. Delhi 214, 1963.

Plumeria acutifolia Poir. in Lamk. Encycl. Suppl. 2:667, 1811.

A small crooked tree. **Leaves** oblong-lanceolate, shortly acuminate. **Flowers** in terminal peduncled, corymbs. **Corolla** white cream with a yellow centre.

Ethnobotanical uses:

Same as *Plumeria rubra* Linn.

Flowering: August-November.

Local Name: 'Khair-champa'

5. Tabernaemontana Linn.

Tabernaemontana divaricata Linn. R. Br. in Roem. & Schult. Syst. 4:427, 1819; FPP. 158, 1978.

Nerium divaricatum Linn. Sp. Pl. 209, 1753 (Quad Syn. Fl. Zey. excl. Syn. Hermann).

Ervatamia divaricata (Linn.) Burkill in Rec. Bot Surv. Ind. 10:320, 1925.

Tabernaemontana coronaria Willd. Enum. Hort. Berol. 275, 1809; FBI. 3:646, 1882.

A medium sized glaucous shrub. **Leaves** oblong to lanceolate, entire undulate, acute or acuminate; stipules cupular; adaxial surface shining. **Flowers** white in terminal, peduncled cymes, pure white, fragrant at night. **Corolla** pure white with yellow centre. **Fruit** not seen.

Flowering: April-October.

6. **Nerium** Linn.

Nerium indicum Mill. Gard. Dict. n. 2. 1786; Fl. Delhi 215, 1963.

Nerium odorum Soland. in Ait. Hort. Kew 1:297, 1789; FBI. 3:655, 1882.

Nerium oleander Blanco, Fl. Filip. 104, 1837; 75, 1845; 1:140. t. 47. 1877 (non Linn.).

A large evergreen shrub with divaricate branches originatibg from the base. **Leaves** ternate, shortly pedicelled, glabroue, dark green above; margins slightly revolute; apex acute. **Flowers** white or dark pink in terminal cymes. **Fruits** not seen.

Ethnobotanical uses:

Root is applied to the vegina for abortifacient and its decoction in piles, ulcers and skin diseases. Paste of the leaves is applied over the ring worm and its decoction in killing the other skin parasites.

Flowering: Nearly round the year.

Local Name: 'Kaner'

LXVIII. ASCLEPIADACEAE

Key to Genera:

Erect herb, shrubs or small trees.

Flowers white and purple; stem white tomentose ..... 1. *Calotropis*

Flowers orange - red; stem nearly glabrous ..... 2. *Asclepias*

Climbers.

Filaments connate:

Anthers with membranous tip:

Leaves linear-lanceolate; flowers pink-purple; follicle smooth ..... 3. *Oxystelma*

Leaves broad ovate; flowers yellowish-green; follicle echinate ..... 4. *Pergularia*

Anthers without membranous tip:

Leaves ovate - lanceolate; flowers purple-blue ..... 5. *Cryptostegia*

Leaves ovate-oblong; flowers greenish-yellow ..... 6. *Leptadenia*

1. Calotropis R. Br.

Key to species:

Large shrubs or small trees; leaves subsessile:

Flowers bluish-purple, buds ovoid;
corona horned at apex .....1. *C. gigantea*

Flowers with blotched purple
corolla tips, buds hemispheric;
corona not horned at apex .....2. *C. procera*

1. **Calotropis gigantea** (Willd.) Ait. f. Hort. Kew, 2:78, 1811; FBI. 4:17, 1883; FUGP. 1:497, Repr. ed. 1960; Ind. Tr. 471, Repr. ed. 1971.

Asclepias gigantea Willd. Sp. Pl. 1264, 1797.

A large shrub and some times almost a small tree, with deeply cracked bark, when grown up. Young parts and under surface of leaves covered with floccose tomentum. **Leaves** subsessile, obovate or oblong, coriaceous, base auricled, cottony both surfaces, glabrous at length. **Flowers** in peduncled cymes, buds ovoid. **Sepals** 5, slightly connate at base with basal glands, ovate, acute. **Petals** 5, connate, purplish or white, lobes ovate-lanceolate, spreading. **Corona** bluish-purple, horned at apex, base ending into blunt spurs. **Follicles** recurved, turgid, apex uncinate. **Seeds** many, ovate, minutely pubescent with a silky coma.

Occassionally found in waste lands.

Flowering: December-May; **Fruiting:** February-June.

Siddiqui 3159, Asgaon.

2. **Calotropis procera** (Willd.) Dryand ex W. Ait. Hort. Kew, ed.

2. 2:78, 1811; FBI. 4:18, 1883; FUGP. 1:498, Repr. ed. 1960; HFDD. 304, 1977.

Asclepias procera Willd. Sp. Pl. 1:1263, 1798.

A much spreading shrubby herb. **Leaves** broadly-ovate-oblong, covered with white waxy tomentum, particulary when young. **Flowers** in umbellate terminal cymes. **Sepals** 5, connate at the base. **Petals** 5, connate whitish-purple, corona not horned at the apex. **Follicles** ellipsoid, ovoid, recurved at apex.

Abundant in waste places, especially in sandy soils.

Ethnobotanical uses:

Powered of the dried leaves is dusted over wounds, ulcers and old sores. Smoke of the burning leaves is inhaled for the cure of asthma and cough. Poultice of the slightly roasted leaves is applied to inflammatory swellings; rheumatic joints etc. Juice of the leaves and latex is applied in various skin diseases, rheumatism, leprosy. Very small dose of dried flowers are given in leprosy, secondary syphilis and gonorrhoea.

Flowering & Fruiting: April-June.

Local Name: 'Madar'

Siddiqui 31311, Atwa.

2. **Asclepias** Linn.

Asclepias curassavica Linn. Sp. Pl. 215, 1753; FBI. 4:80, 1883; Woodson, An. Miss. Bot. Gard. 41:59, 1951; FUGP. 1:514, Repr. ed. 1960; FPP. 160, 1978.

An erect mostly simple or branched herb; branching from the woody

base, glabrous, younger parts hairy. **Leaves** lanceolate, glabrous, entire, acute or acuminate at apex, petioled. **Flowers** in leaf-opposed or lateral long peduncled cymes; peduncles usually larger than the petiole, hairy. **Calyx** 5-lobed; lobes lanceolate. **Corolla** red, reflexed, lobes longer than the sepals, obtuse, corona scales orange. **Follicles** not seen.

Cultivated as an ornamental.

Flowering & Fruiting: Cold season.

Siddiqui 31996, D.M. Lodge.

3. **Oxystelma** R. Br.

Oxystelma secamone (Linn.) K. Schum. in Engl. & Prantl, Nat. Pfam. 4(2):229, 1895.

Periploca secamone Linn. Mant. 216, 1771.

Oxystelma esculentum R. Br. in Mem. Wern. Soc. 1:40, 1810; FBI. 4:17, 1883; FUGP. 1:500, Repr. ed. 1960.

A much spreading twinning shrub. **Stem** slender, much branched. **Leaves** linear-lanceolate. **Flowers** in few-flowered, drooping, sub-umbellate cymes, purple-violet. **Corona** double, corolline one annular, staminal one represented by 5 scales. **Follicles** 4-6.5 cm long, smooth, topering to a point. **Seeds** many, comose.

Twinning among *Prosopis* in open scrub forest.

Flowering: August-September; **Fruiting:** October.

Siddiqui 31142, Lucknow Road.

4. **Pergularia** Linn.

Pergularia daemia (Forsk.) Blatt. & McCann in Journ. Bomb. Nat. Hist. Soc. 36(3):528, 1933.

Asclepias daemia Forsk. Fl. Aegypt. Arb. 51, 1775.

Daemia extensa R. Br. in Mem. Wern. Soc. 1:50, 1810; FBI. 4:20, 1883; FUGP. 1:501, Repr. ed. 1960.

A much spreading twinning shrub. **Stem** clothed with hispid hairs. **Leaves** broadly ovate, deeply cordate. **Flowers** in axillary peduncled cymes, yellowish-green, tinged with reddish-brown, corona double. **Pollinia** sub-compressed, white-waxy, pendulous. **Follicles** reflexed narrowed at apex, softly echinate. **Seeds** many narrowly margined, comose.

Extensively twinning on hedges and small trees.

Flowering: April-MAy; **Fruiting:** May-September.

Siddiqui 31117, Bilgram road.

5. **Cryptostegia** R. Br.

Cryptostegia grandiflora R. Br. in Bot. Reg. t. 435, 1819; FBI. 4:6, 1883; FPP. 161, 1978.

Nerium grandiflorum Roxb. Fl. Ind. 2:100, 1824.

A large climber. **Stem** woody at base. **Bark** ashy-grey, lenticels warty and trnsverse. **Leaves** ovate-lanceolate, short acuminate, tough, glaucous, margins undulate. **Flowers** in terminal cymes, light violet-purple, campanulate. **Corona** scales corolline, reddish-violet. **Follicles** divaricate, trigonous.

Cultivated as an ornamental.

Flowering & Fruiting: Nearly round thr year.

Siddiqui 31986, Inspection House.

6. **Leptadenia** R. Br.

Leptadenia reticulata (Retz.) Wight et Arn. in Wight Contrib. 47, 1834; FBI. 4:63, 1833; FUGP. 1:511, Repr. ed. 1960; FPP. 162, 1978.

A medium sized, herbaceous climber. **Stem** woody at base; young parts tomentose. **Leaves** oblong, subcordate at base, entire, thinly hairy. **Flowers** in peduncled, axillary, umbellate cymes, yellowish-green. **Sepals** 5, connate at base, hairy. **Corolla** 5-lobed, longer than the sepals, acute, margins revalute, pubescent externally. **Follicles** 7-8 cm long, smooth apex acuminate, curved. **Seeds** comose.

Often found among the hedges.

Flowering & Fruiting: June-January.

Siddiqui 31361, Pokhar.

LXIX. BUDDLEJACEAE

Buddleja Linn.

Buddleja asiatica Lour. Fl. Cochinch. 72, 1790; FBI. 4:82, 1883; FUGP. 1:516, Repr. ed. 1960; Marquand, Kew Bull. 1930:195, 1930; Leenhouts, Fl. Males. Ser. 1. 6:337, 1962; Fl. Delhi 222, 1963; HFDD. 309, 1977.

A large evergreen, straggling shrub. Young parts and undersurface of leaves hoary or grey densely stellate tomentose. **Leaves** opposite, lanceolate, acuminate, crenate or serrulate, upper ones entire base narrowed to petiole, glabrate above, fluffy-white beneath. **Flowers** fragrant, white or bluish white, in large terminal erect-drooping panicles. **Sepals** 4, connate, companulate, calyx-lobes triangular-ovate, hairy outside. **Petals** 4, connate, tubular-urceolate, purplish-white, densely tomentose outside. **Stamens** 4, inserted near at the throat of corolla; filament short; anthers 2-celled, longitudinally splitting. **Fruit** ellipsoid.

Grown commonaly in hedges and shrubberies. Often as an escape along 'nalas' and river beds.

Flowering: December-March; **Fruiting:** February-June.

Siddiqui 31587, Chak.

LXX. GENTIACEAE

Key to Genera:

Floating herbs, flowers white.....*1. Nymphoides*

Terrestrial herb;

Flowers zygomorphic.

Corolla white .....*2. Conscora*

Corolla pale-yellow.....*3. Hoppea*

Flowers actinomorphic.

Corolla pink-purple.....*4. Centaurium*

1. **Nymphoides** Hill

Nymphoides indicum (Linn.) O. Kuntze in Rev. Gen. Pl. 429, 1891; FPP. 167, 1978.

Menyanthes indica Linn. Sp. Pl. 145, 1753.

Limnanthemum indicum Griseb. emend. Thw. Enum. 205, 1850; FBI. 4:131, 1883; FUGP. 1:525, Repr. ed. 1960.

Aquatic, floating herb. **Stem** long, rooting at nodes. **Leaves** orbicular-cordate or ovate-cordate, petioled decurrent. **Flowers** long pedicelled, fascicled in axis, raised above the water surface. **Calyx** 5-cleft. **Corolla** 5-lobed, lobes thickly fimbriate, base yellow. **Stamens** 5-7. **Capsule** subquadrate; fruiting stalk recurved.

Abundant in ponds and ditches.

Flowering: May-August; **Fruiting:** December-February.

Siddiqui 31415, Madia.

Plants associated: *Vallisnaria spirallis*, *Rorippa nasturtium-aquaticum* etc.

2. **Conscora** Lamk.

Conscora decussata (Roxb.) J. A. Schultz. & J. H. Schult. Syst. Veg. Mant. 1:229, 1822; FBI. 4:104, 1883; FUGP. 1:523, Repr. ed. 1960; HFDD. 311, 1977.

Pladera decussata Roxb. Fl. Ind. ed. Carey & Wall. 1:418, 1820.

An erect branched annual herb, 40-60 cm tall. **Stem** 4-winged; branches decussat, glabrous. **Leaves** sessile, ovate-lanceolate to oblong with semi-amplexicual base, 3-5 nerved. **Flowers** in leafy cymes, white, 4-winged pedicels. **Calyx** tube 1-1.2 cm long, 4-winged; lobes ovate-lanceolate, acute. **Corolla** white, tube 0.8-1 cm long; segments unequal obovate. **Capsule** oblong, nearly as long as calyx.

Often found in damp grassy localities of forest edges.

Flowering: August-September; **Fruiting:** October-November.

Siddiqui 31478, Manjhola.

3. **Hoppea** Willd.

Hoppea dichotoma Willd. in Ges. Naturf. Fr. Berl. Neue Schr. 3:434, 1810; FBI. 4:100, 1883; FPP. 167, 1978.

Pladera pusilla Roxb. Fl. Ind. 1:403; Clarke in Journ. Linn. Soc. 16:429; Don. in Trans. Linn. Soc. 17:530.

A small glabrous, divaricately branched, annual. **Stem & Branches** 4-angled. The plant turn greenish-yellow on drying. **Leaves** nearly

sessile, ovate, acute, entire. **Flowers** axillary, greenish-yellow. **Calyx** lobes ovate, acuminate. **Corolla** smaller than the calyx, pale-yellow. **Fruit** not seen.

Occassionally found in marshy situations.

Flowering: Winter season.
Siddiqui 31565, Baturi purva.

Plants associated: *Scripus mucronatus*, *Alopecurus nepalensis*, *Juncus* sps., *Trifolium* sps., *Asphodelus tenuifolius* etc.

4. **Centaurium** Hill

Centaurium pulchellum (Sw.) Druce, Berks. 342, 1897; Robyns, Bull. Jard. Bot. Brux. 24:375, 384, 1954; Taylor, Fl. West. Trop. Afr. ed. 2. 2:300, 1963; HFDD. 312, 1977.

Gentiana pulchella Sw. Vet. -Ak. Handl. Stockh. 86, pl. 3. f. 8-9, 1783.

Centaurium ramosissimum (Pers.) Druce, Repr. Bot. Exch. Club. Brit. Isles. 4:274, 1916.

Erythraea ramosissima Pers. Syn. Pl. 1:283, 1805; FBI. 4:101; FUGP. 2:520, Repr. ed. 1960.

Erect annual herb, branching from upper part. Lower leaves broader upper ones narrower, sessile, lateral nerves obscure on upper face, entire. **Flawers** in leafy cymose penicles; sessile, flowers in the dichotomy pedicelled. **Calyx** lobes linear. **Style** lobes hairy.

Commonaly found in lawns and grassy localities.

Flowering: March-May; **Fruiting:** June.

Siddiqui 31255, Jhala.

LXXI. POLEMONIACEAE

Phlox Linn.

Phlox drumondii Hook. Bot. Mag. t. 3441, 1835; Braud, Pfreich. 27:70, 1907; Man. Cult. Pl. 826, 1949; HFDD. 315, 1977.

Erect glandular hiary herb; stem simple or branched. **Leaves** sessile, lower opposite, upper alternate; base semiamplexicaul; entire, obtuse or acute. **Flowers** in corymbose cymes, pedicelled. **Calyx** lobes tipped with a short awn. **Corolla** variously coloured. **Stamens** 5, inserted at unequal heights on the corolla tube. **Ovary** 2-3 celled; style 1, filiform, 2-3 fid.

Grown as a winter annual. Usually the corolla lobes are crenulate in this plant but a variety with fimbriate petals is also under cultivation.

Flowering: December-April; **Fruiting:** April.

Siddiqui 31968, Tara Academy.

LXXII. BORAGINACEAE

Key to Genera:

Herbs.

Flowers yellow; root red .....1. *Arnebia*

Flowers not yellow; root colourless.

Corolla tube without scales in the throat (sometimes throat with slight intrusion of the sinuses of corolla tube in *Trichodesma*).

Flowers white, small in terminal dichotomous scorpioid cymes; anthers not forming a cone, the tips of connectives not excurrent; leaves linear .....2. *Heliotropium*

Flowers pinkish - blue, larger, solitary axillary; calyx hastate at the base; anthers forming a cone; the connective tip ex-current and twisted .....3. *Trichodesma*

Flowers creamy - white, short in axillary cymes or solitary axillary,

filament short and hairy at base, leaves oblong-ovate, cripsid .....4. *Coldenia*

Corolla tube with scales in the throat.

Erect herb; leaves oblong lanceolate; nutlets more or less glochidiate on the back .....5. *Cynoglossum*

Prostrate herbs; leaves obllong,spathulate or lanceolate; nutlets granular scabrid on the back .....6. *Bothriospermum*

Trees or large shrubs.

Ovary 4-celled; ovule 1 in each cells; styles 4 due to the bifurcation of primary style arms .....7. *Cordia*

Ovary 2-celled; ovules 2 in each cell; styles 2 (primary style arms undivided) .....8. *Ehretia*

1. **Arnebia** Forsk.

Arnebia hispidissima (Sieb. ex Lehm.) DC. Prodr. 10:94, 1846; FBI. 4:176, 1883; FUGP. 1:541, Repr. ed 1960; FPP. 173, 1978.

Lithospermum hispidissimum Seib. ex Lehm. Icom. Nov. Strip. t. 39, 1821.

A diffuse very hispid herb; hair bases red and bulbous. **Root** deep scarlet red colour. **Stem** many from a woody base. **Leaves** sessile, linear, lanceolate, subobtuse, entire, densely hispid on both surfaces but more so adaxilly. **Flowers** in compact secund racemes or spikes, bracts, linear, hispid, single-nerved. **Calyx** divided almost to the base, covered with long hispid hairs; segments unequal, acute. **Corolla** yellow, hairy outside, the tube is constricted in the middle. **Stamens** 5; anthers long; filaments extremely short, there is an annulus of white hairs at the base of stamens. **Style** bifid near the apex. **Style** 2; stgima reniformly capitate, papillose. **Ovary** deeply 4-lobed, heterostylous and gynobasic. **Fruit** of 4-nutlets, tuburculate.

Often found near dry-sandy-clayey soils.

Flowering: February-May; **Fruiting:** May-July.

Siddiqui 31246, Reddupur.

2. **Heliotropium** Linn.

Key to species:

Calyx broader the corolla, sepals broad, enclosing the fruit, prostrate, villous .....1. *H. supinum*

Calyx narrow, sepals narrow, not enclosing the fruit:

Corolla lobes acuminate. A woody, hispid herb or under shrub .....2. *H. subulatum*

Corolla lobes not acuminate. A small procumbent herb .....3. *H. strigosum*

1. **Heliotropium supinum** Linn. Sp. Pl. 130, 1753; FBI. 4:149, 1883; FUGP. 1:535, Repr. ed. 1960: Fl. Delhi 225, 1963.

A prostrate or decumbent, deep rooted, villous herb. **Leaves** elliptic-ovate, appressedly silky tomentose. **Flowers** white in simple or forked, softly hirsude 2-3.5 cm long spikes. **Sepals** 5, connate halfway, hairy. **Petals** 5, connate, tube villous. **Stamens** 5, 2-celled, included, lanceolate. **Carpels** 2, connate; ovary 4-celled; style 1; stigma conicle with sigmatic ring at its base. **Fruits** ovate to subglobose. **Nutlets** 2-4, warted, enclosing by calyx.

Commonaly found in dry, hardy clayey soil of the ditches and ponds.

Flowering: May-June; **Fruiting:** June-August.
Siddiqui 31384, Lakhimpur Road.

2. **Heliotropium subulatum** Hoschst. ex DC. Prodr. 9:528, 551, 1845; FUGP. 2:91, Repr. ed. 1960; Fl. Delhi 226, 1963.

Heliotropium zeylanicum Cl. in FB. 4:148, 1883 (non Lamk.); Wt. Ic. t. 892.

A woody, hispid herb or under shrub. Main stem erect or lying on the ground, much branched. **Leaves** sessile or nearly so, narrowly lanceolate, acute, subentire, tapering towards the base, nerve indistinct above. **Flowers** sessile, ebractiate spikes, unilateral or sometimes 2-ranked, especially towards the apex of the spike. **Calyx** divided to the base, hairy on both sides; segments ovate, acute, ciliate. **Corolla** lobes caudate-acuminate, spreading.

Stamens attached to the swollen portion of the corolla tube; anthers sessile bifid at the apex. **Style** glabrous, stigmatic rings supporting a long cone which is penicellate with white shining hairs. **Nutlets** 4, tuberculate on the back.

Commonally found on the road sides and on rubbish heap.

Flowering & Fruiting: August-April.

Siddiqui 31477, Majhola.

3. **Heliotropium strigosum** Willd. Sp. Pl. 1:743, 1798; FBI. 4:151, 1883; FUGP. 1:537, Repr. ed. 1960; FPP. 170, 1978.

Heliotropium brevifolium Wall. ex Roxb. Fl. Ind. 2:2, 1832.

A prostrate to decumbent, annual herb; branches spreading in all directions from the base; whole plant hispidly hairy. **Leaves** linear-lanceolate, appresed hairy, single-nerved. **Flowers** white, small, in bractiate, branched, secund spikes. **Stamens** 5; anthers ovate, 2-celled; connective prolonged into a beak. **Fruit** ovoid; nutlets 4.

Abundant, found in waste places and on road sides; preferebly in sandy soils.

Flowering & Fruiting: Februaury-October.

Siddiqui 31240, Kundouli.

3. **Trichodesma** R. Br. nom. cons.

Trichodesma indicum (Linn.) R. Br. (Prodr. 496, 1810, Comb. in Vol.) ex Lehm. Pl. Asperifol. 195, 1818; FBI. 4:153; 1883, FUGP. 1:538, Repr. ed. 1960; Brand, Pfreich. 78:38, 1921; HFDD. 318, 1977.

Borago indica Linn. Sp. Pl. 137, 1753.

An annual erect, diffused herb; rough with appresed, multicellular, stiff, bulbous based hairy, young parts tinged with light red. **Leaves** mostly sessile, ovate, oblong or lanceolate; base narrowed, cordate; upper surface clothed with stiff hairs, seated on flattened circular discs (leaves when viewed against the light disc appear opaque), lower surface nearly villous or quite glabrous except the nerves and veins. **Flowers** pale-blue turning to pink or white. **Calyx** segments connate, except the apices; each segment keeled, acute apex reflexed after anthesis; base cordate or hastate. **Corolla** lobes ovate, abruptely accuminate; in centre with 5-6 brown spots which unite to form a ring. **Anthers** sessile; apices long, flat, pubescent at the base, all twisted together to form a rope like structure. Corolla tube 5-nerved below the anthers; anther bases also hairy.

Common, grown in variety of soils, prefers damp localities.

Ethnobotanical uses:

Plant is used as demulcent, alterative and in skin diseases. Flowers is used as an antidot of snake poison.

Flowering: March-August; **Fruiting:** September-November.

Local Name: 'Jhingi'

Siddiqui 31284, Atwa.

4. Coldenia Linn.

Coldenia procumbens Linn Sp. Pl. 125, 1723; FBI. 4:144, 1883;

FUGP. 1:532, Repr. ed. 1960; Fl. Delhi 225, 1963.

A procumbent deep rooted hairy herb with trailing, stout stem lying flat on the ground. **Leaves** obovate-oblong, oblique at base, crisped, crenate, dentate, appressedly hairy above, nearly so beneath. **Flowers** creamy-white, small, solitary axillary or few in axillary cymes, 4-merous. **Corolla** tube 2.5-4 mm long, lobes reflexed. **Stamens** included; filament short, hairy at base. **Ovary** shallowly 4-lobed; style 2, short. **Drupe** obconic, splitting into 4, one seeded pyrenes.

Commonaly found in drying ditches and ponds. Also found in moist paddy fields.

Flowering: May-August; **Fruiting:** July-September.
Siddiqui 31344, Chhatouri.

5. Cynoglossum Linn.

Cynoglossum lanceolatum Forsk. Fl. Aegypt. -Arab. 41, 1775; FBI. 4:176, 1883; FUGP. 1:540, Repr. ed. 1960; HFDD. 317, 1977.

An erect scabrous, strigose herb, lower part somewhat woody, appresed hispid. **Leaves** sessile, broadly lanceolate, nerves prominent abaxially; acute at both ends, dentate, appresed hairy with bulbous based hairs. **Flowers** white with a blue centre; in elongated, branched and penicled racemes. **Corolla** yellowish-white or white; segments ovate-oblong; throat scales bluish. **Nutlets** glochidiate.

Common in waste lands, grass lands and road sides.

Flowering & Fruiting: July-December.

Siddiqui 31416, Madia.

6. **Bothriospermum** Bunge

Bothriospermum tenellum (Hornem.) Fisch. & Mey. Ind. Sem. Hort. Petrop. 24, 1835; FBI. 4:167, 1883; HFDD. 316, 1977.

Anchusa tenellum Hornem. Hort. Hafin. 1:176, 1813.

A weak prostrate or diffused strigose herb. Stem elongated, caespitose. **Leaves** oblong, elliptic or spathulate, mucronate. **Flowers** distinctly pedicelled, white. **Corolla** throat scales 5. **Stigma** capitate. **Nutlets** ellipsoid, tuberculate; with an elliptic, smooth margined areole.

Commonaly found in grassy land of river sides.

Flowering & Fruiting: Cold Season.

Siddiqui 31566, Baturi purva.

7. **Cordia** Linn.

Cordia dichotoma Forst. f. Prodr. 18, 1786; Santapau in Rec. Bot. Surv. Ind. 16(1):163, 1967; FPP. 173, 1978.

Cordia obliqua Willd. Phytogr. 4. t. 4, 1794; FBI. 4:137, 1883.

Cordia myxa auct. pl. (non Linn.)

A medium sized tree with grey to brown bark, longitudinally fissured. **Leaves** upper surfaces glabrous to scabrous, lower pubescent especially when young; broadly ovate to elliptic-oblong or sub-orbicular, serrate, base cordate or somewhat cuneate. **Flowers** in axillary and terminal cymes, white, shortly

pedicelled, polygamous. **Calyx** glabrous outside, pubescent within corolla equalling the calyx tube; lobes narrow, oblong, obtuse, recurved. **Stamens** exerted; filaments hairy below. **Drupe** ovoid, apiculate, yellow, pink.

Commonaly planted in houses near villages.

Ethnobotanical uses:

Leaves boiled with black pepper and a pinch of common salt and its decoction is used in cough and fever. Dry fruits is used in cough and chest affections and in irritations of urinary passages.

Flowering: March-April; **Fruiting:** July-August.

Local Name: 'Lasora'

Siddiqui 31283, Atwa.

8. Ehretia Linn.

Key to species:

Leaves serrate; flowers in terminal penicles.....1. *E. acuminata*

Leaves entire; flowers in terminal and axillary dichotomously branched corymbose cymes .....2. *E. laevis*

1. Ehretia acuminata R. Br. Prodr. 497, 1810; FBI. 4:141, 1883; FUGP. 1:531, Repr. ed. 1960; Fl. Delhi 228, 1963.

A moderate-sized deciduous tree. **Bark** dark grey, with longitudinally cracks. Young shoots pubescent. **Leaves** elliptic or ovate-oblong, sharply, serrate, almost glabrous and shinning

above. Flowers white or creamy, fragrant, in large terminal penicles. Calyx & Corolla nearly of equal length; style shortly 2-fid. Drupe orange red or dark purple; pyrenes 2, each 2-seeded.

Often found in grass land of the forest area.

Flowering: March-April; **Fruiting:** November-December.

Siddiqui, 31268, Mama purva.

2. **Ehretia laevis** Roxb. Pl. Core. 1:42. t. 56, 1796; FBI. 4:141, 1883; FUGP. 1:531, Repr. ed. 1960; Fl. Delhi 229, 1963.

A small tree with foliage not very dense; bark ashy-grey, smooth. Leaves subcoreacious, elliptic, ovate, entire, glabrous, dark green, petioled; main lateral nerves 6-10 pairs; younger leaves slightly rusty tomentose. Flowers white, subsessile in much branched, pubescent, axillary and terminal corymbose, peduncled, cymes, composed of unilateral, curved spikes. Calyx pubescent internally as well externally; lobes ovate, acute. Corolla rotate, pubescent, obtuse, oblong; filaments glabrous, slightly dilated near the base.

Common near villages.

Flowering: February-March; **Fruiting:** April-June.

Siddiqui 31256, Jhala.

LXXIII. CONVOLVULACEAE

Key to Genera:

Leafless total stem parasitic, yellow, threadlike herbs .....1. *Cuscuta*

Leaves fully developed, autotrophs.

Prostrate herb.

Leaves linear,hairy;flower pinkish white, nearly sessile; style one; stigma 2 .....2. *Convolvulus*

Leaves oblong orbicular, glabrous or hairy (then flower blue);styles two, distinct from the base .....3. *Evolvulus*

Climbers.

A large climber; abaxial surface of leaves silvery tomentose;nerves prominent; ovary 4-celled; fruit mealy .....4. *Argyreia*

Small climbers, climbing on shrubs or herbs; fruit dry.

Flowers large axillary and terminal panicles; white 3-sepals enlarged in fruits .....5. *Porana*

Flowers axillary not paniculate.

Stem winged; leaves entire; sepals greatly enlarged in fruit; fruits circumscissile .....6. *Operculina*

Stem not winged.

Flowers yellow .....7. *Merremia*

Flowers not yellow.

Corolla tube usually uniformally enlarged from the base, 5-bands on the lobes rarely clear; pollen not echinulate .....2. *Convolvulus*

Corolla tube not uniformally enlarged from the base, five bands on the lobes clearly defined by two lines; pollen echinulate .....8. *Ipomoea*

Cuscuta reflexa Roxb.

1. **Cuscuta** Linn.

Cuscuta reflexa Roxb. Pl. Cor. 2:3. t. 104, 1798; FBI. 4:225; FUGP. 1:543, Repr. ed. 1960; Yuncker, Mem. Torrey Bot. Cl. 18:259, 1932; Ooststr. Blumea 3:70, 1938; Fl. Males. Ser. 1. 4:393, 1953; HFDD. 321, 1977.

Cuscuta santapaui Benerjee & Das, Journ. Arn. Arb. 46:87, 1965. Syn. nov.

A much spreading twinning herb. **Stem** brown or greenish-yellow, thread like. **Leaves** none or greatly reduced to just scales. **Flowers** sessile in racemosely arranged clusters, bracteate. **Calyx** segments ovate, obtuse; nearly similar to corolla. **Corolla** white, lobes ovate, triangular, reflexed, scaly inside; scales fimbriate. **Ovary** seated on a disc, when punctured a yellow-brown viscous fluid oozes out from the disc.

Abundant. Commonly parasitizes on a variety of hosts.

Ethnobotanical uses:

The plant is alterative, purgative, stringent and anthelmintic. Paste of the whole plant is applied on boils. The seeds are carminative and alterative; its poultice is applied as an anodyne.

Flowering: September-February; **Fruiting:** December-March.

Local Name: 'Amarbel'

Siddiqui 31257, Jhala.

2. Convolvulus Linn.

Key to species:

Hairy prostrate herb; leaves linear; flowers sessile .....1. *C. microphyllus*

Glabrous, twinner; leaves broad, hastate; flowers distinctly pedicelled.....2. *C. arvensis*

1. Convolvulus microphyllus Sieb. ex Spreng. Syst. 1:611, 1825; FBI. 4:218, 1883; Bole & Shah Journ. Bomb. Nat. Hist. Soc. 58:838, 1961; FPP. 175, 1978.

Convolvulus pluricaulis Choisy in Mem. Soc. Phys. Hist. Nat. Geneva, 6:95, 1883; FUGP. 1:547, Repr. ed. 1960.

A prostrate or suberect, spreading, hairy, perennial herb. **Branches** many, arising from a woody base, densely hairy. **Leaves** ovate-lanceolate to linear, very shortly petioled. **Flowers** white or pinkish, solitary or in few flowered clusters. **Sepals** hairy. **Corolla** shortly funnel shaped. **Capsule** oblong-globose, pale-brown; pericarp charteceous. **Seeds** brown, minutely puberulous.

Common in sandy and dry places.

Ethnobotanical use:

Decoction of the whole plant is used in the diabetes.

Flowering: February-June; **Fruiting:** May-August.

Local Name: 'Shankh-holy' or 'Kourilla'

Siddiqui 31391, Lakhimpur Road.

2. **Convolvulus arvensis** Linn. Sp. Pl. 153, 1753; FBI. 4:219, 1883; FUGP. 1:548, Repr. ed. 1960; HFDD. 320, 1977.

Readily distinguishable from preceding species by its twinning habit; petioled, hastate leaves; pedicelled flowers and glabrous plant body.

Abundant, mainly in wheat fields.

Ethnobotanical use:

Root is used as purgative.

Flowering: September-February; **Fruiting:** March-April.

Local Name: 'Hiran-khuri'

Siddiqui 31476, Majhola.

3. **Evolvulus** Linn.

Key to species:

Plant glabrous, flowers white .....1. *E. nummularius*

Plant hairy, flowers blue .....2. *E. alsinoides*

1. **Evolvulus nummularius** (Linn.) Linn. Sp. Pl. ed. 2. 391, 1762; Fl. Males. Ser. 1. 5:558, 1958; HFDD. 322, 1977.

Convolvulus nummularius Linn. Sp. Pl. 157, 1753.

Prostrate, creeping, perennial herb, often rooting from the nodes. **Stem** patentely hairy. **Leaves** ovate-elliptic, rounded-suborbicular, rounded, retuse, glabrous except hairy nerves; petioled. **Flowers** 1-2 in axillary cymes; pedecelled. **Sepals** 5, basally connate, lanceolate, ciliate. **Petals** 5, basally connate, rotate; lobes oblong, hairy along middle line. **Capsule** globose.

Commonly found in sandy soils of waste places.

Flowering: March-November; **Fruiting:** September-December.

Siddiqui 31282, Atwa.

2. Evolvulus alsinoides (Linn.) Linn. Sp. Pl. ed. 2. 392, 1762; FBI. 4:202, 1883; FUGP. 1:546, Repr. ed. 1960; Fl. Males. Ser. 1. 4:395, 1953; HFDD. 321, 1977.

Convolvulus alsinoides Linn. Sp. Pl. 157, 1753.

A prostrate, ascending, multi-cauline, appressed hairy herb. **Leaves** ovate-lanceolate, acute, entire and shortly petioled. **Flowers** axillary, solitary or in clusters of 1 or 3. **Calyx** segments lanceolate, acute, hairy. **Corolla** blue. **Stamens** white. **Capsule** globose.

Common, often found on fallow lands and road sides.

Ethnobotanical uses:

Decoction of leaves and flowers is used in diarrhoea. Paste of the root and leaves are applied over bowel affections.

Flowering: August-December; **Fruiting:** October-December.

Local Name: 'Neela Shunkh pushpi'

Siddiqui 31124, Hasia.

4. Argyreia Lour.

Argyreia nervosa (Burm. f.) Boj. Hort. Maurit. 224, 1837; Fl. Delhi 231, 1963.

Convolvulus nervosa Burm. f. Fl. Ind. 48. t. 20. f. 1, 1763.

Argyreia speciosa Sweet, Hort. Brit. 289, 1827; FBI. 4:185, 1883;

FUGP. 1:561, Repr. ed. 1960.

A robust twinning shrub. **Stem** woody at base; younger portions densely, silvery, appressed hairy. **Leaves** ovate, cordate, densely silvery white hairy, especially abaxially. **Flowers** in few flowered cymes on long peduncles; bracts foliaceous. **Corolla** funnel-shaped; purple in colour.

Cultivated. Often grown in gardens.

Ethnobotanical uses:

The root is used as an alterative, affrodisiac and diuretic. Paste of the leaves is applied over the skin diseases and wounds, (tumors, boils, sores, carbuncles etc). A paste of the root made with rice water is applied over rheumatic swellings.

Flowering & Fruiting: August-June.

Local Name: 'Samandar-palak'

Siddiqui 31471, Gulamau.

5. **Porana** Burm. f.

Porana paniculata Roxb. Pl. Cor. 3:31, 1819; FBI. 4:222, 1883; FUGP. 1:544, Repr. ed. 1960; Ooststr. Blumea 3:93, 1938; Fl. Males. Ser. 1. 4:404, 1953; HFDD. 328, 1978.

A dextro-twinning perennial shrub. **Leaves** ovate-oblong; base cordate, apex acuminate. **Flowers** in large, axillary and terminal drooping panicles, small, white. **Calyx** deeply 5-lobed, pubescent; 3 of them enlarging in fruit. **Corolla** tubular, hairy outside. **Stamens** 5, included. **Style** short, undivided. **Stigma** capitate.

A pretty climber on the edges of scrub forest, often cultivated.

Flowering & Fruiting: November-March.

Siddiqui 31555, Hardoi.

6. Operculina S. Manso

Operculina turpethum (Linn.) S. Manso, Enum. Subst. Bras. 16. 19, 1836; FUGP. 1:552, Repr. ed. 1960; HFDD. 327, 1977.

Convolvulus turpethum Linn. Sp. Pl. 155, 1753.

Ipomoea turpethum (Linn.) R. Br. Prodr. 485, 1810; FBI. 4:212, 1883.

A stout, twinning herb with winged stem and milky latex. Leaves distant, ovate or oblong, acute, entire; base cordate or truncate. Flowers in few flowered cymes; bracteate; bracts oblong lanceolate, pubescent. Calyx outer sepals pubescent; inner glabrous. Corolla white. Capsule globose; enclosed in greatly enlarged pubescent, calyx segments.

Nor uncommon, often found near villages.

Ethnobotanical uses:

Decoction of roots is used to wash injured portion of the snake bite and also taken orally. Roots are also used in melancholia, leprosy, rheumatism and paralysis.

Flowering & Fruiting: Rainy and winter season.

Local Name: 'Chitabansa'

Siddiqui 31588, Chak.

7. Merremia Dennst.

Merremia hederasa (Burm. f.) Hall. f. Bot. Jahrb. 18:118, 1894;

Ghosh & Sikdar, Ind. Journ. For. 6(3):214-222, 1983.

Evolvulus hederasa Burm. f. Fl. Ind. 77. t. 20. f. 2, 1768.

Ipomoea chryseides Ker-Gawl. Bot. Reg. t. 270, 1817; FBI. 4:206, 1883.

Merremia chryseides Hall. f. Bot. Jahrb. 16:552, 1893; FUGP. 1:550, Repr. ed. 1960.

A twinning annual herb. **Stem** branched, glabrous, sometimes rough due to tubercles. **Leaves** ovate, cordate; basal lobes rounded, entire or 3-lobed, acute or apiculate, glabrous; long petioled. **Flowers** in axillary cymes; bracteate; shortly pedicelled; yellow in colour. **Sepals** truncate, apiculate or obscurely toothed; reflexed in fruit. **Corolla** campanulate, distinctly striate. **Seeds** trigonous, velvety.

Abundant. Often on road side ditches and climbs on bushes.

Flowering & Fruiting: Rainy season.

Siddiqui 31417, Madia.

8. Ipomoea Linn.

Key to species:

Plants with fleshy fusyform roots .....1. *I. batata*

Plants without fleshy root stock.

Leaves pinnately or palmately, deeply lobed.

Leaves pinnately lobed, glabrous; flowers red; slender

tubular .....2. *I. quamoclit*

Leaves palmately lobed.

Plant hairy; flowers pink or white .....3. *I. pes-tigridis*

Plant glabrous; flowers violet, blue .....4. *I. cairica*

Leaves entire or shallowly lobed.

Plant aquatic or semiaquatic; giving off black, fibrous roots from the nodes, prostrate; stem fistular, flowers pink .....5. *I. aquatica*

Plant not aquatic, not rooting at the nodes.

Twinners or prostrate, herbaceous.

Leaves white woolly beneath, (sometimes deeply 3-lobed)stem with gland based hairs; sepals narrowly lanceolate, hairy; capsule some what hairy towards the apex .....6. *I. arachnosperma*

Leaves fulvous hairy on both the surfaces stem without gland based hairs; 2-outer sepals broader; capsule glabrous .....3. *I. pes-tigridis*

Erect shrub woody near the base; latex milky; flowers purple-pink .....7. *I. fistulosa*

1. **Ipomoea batata** (Linn.) Lamk. Tabb. Encycl. 1:465, 1791.

Convolvulus batata Linn. Sp. Pl. 154, 1753.

A much branched, glabrous, creeping herb. **Root** fusiform, brown, fleshy white, sweet. **Leaves** ovate-cordate. **Flowers** not seen.

Cultivated for root tubers which are edible.

Flowering & Fruiting: Not seen.

Siddiqui 31266, Mama purva.

2. **Ipomoea quamoclit** Linn. Sp. Pl. 159, 1753; FBI. 4:199, 1883; Santapau in Rec. Bot. Sur. Ind. 16(1):191, 1953; HFDD. 327, 1977.

Quamoclit pinnata (Desr.) Boj. Hort. Maurit. 224, 1837; Bor & Raizada 3. f. 1.

Convolvulus pennatus Desr. in Lamk. Encycl. 3:567, 1792.

Quamoclit vulgaris Choisy in Mem. Soc. Phys. Geneva, 6:434, 1833.

Quamoclit quamoclit Brit. & Brwon, Fl. North Unit. Stat. 3:22, 1898, nom. illeget.

A gracefull, dark-green, slender, glabrous annual climber. **Leaves** pinnate; the segments linear, filiform. **Flowers** bright-red, rarely white in 1-few flowered cymes; peduncles 3-15 cm long. **Sepals** 5, basally connate, sub-equal, persistent in fruit. **Corolla** red, tubular, narrowly funnel-shaped; lobes triangular. **Capsule** with a persistent stylar base. **Seeds** black, compressed, ellipsoid.

Commonly found. Wild as well as cultivated.

Ethnobotanical uses:

Pounded leaves are applied to the bleeding piles. The crushed leaves is also applied as a plaster to carbuncles.

Flowering: July-September; **Fruiting:** October-December.

Local Name: 'Kamal-lata'

Siddiqui 31433, Bara gaon.

3. Ipomoea pes-tigridis Sp. Pl. 162, 1753; FBI. 4:204, 1883; FUGP. 1:557, Repr. ed. 1960; Fl. Delhi 237, 1963; HFDD. 326, 1977.

A medium sized much branched twinning herb. **Stem** covered with spreading hairs. **Leaves** deeply 5-7 palmately lobed; lobes elliptic, lanceolate with sinuses between their bases; sometimes the leaf may be 3-lobed or rarely entire, appressed hairy. **Flowers** pink or white in axillary cymes; bracteate, densely hirsute. **Calyx** 5-lobed; 2 outer larger. **Corolla** funnel-shaped, pink, rarely white. **Ovary** seated on a cupular disc; style one, long; stigma globose. **Fruit** a capsule. **Seeds** minutely hairy.

Abundant, in cultivated fields and among the hedges.

Ethnobotanical uses:

Pounded leaves are applied to the boils and carbuncles.

Local Name: 'Ghiabati'

Siddiqui 31179, Bhaseta.

4. **Ipomoea cairica** (Linn.) Sweet, Hort. Brit. 287, 1827; Ooststr. in Blumea 3:542, 1940, et in Fl. Males. (Ser. 1). 4(4):478, 1953; Backer & Bakh f. Fl. Jawa 2:495, 1965; HFDD. 324, 1977.

Convolvulus cairicus Linn. Syst. (ed. 10). 922, 1775; Clarke in HK. f. FBI. 4:214, 1883.

Ipomoea palamata Forsk. Fl. Aegypt. -Arab. 43, 1775; FBI. 4:414, 1883.

A large much branched glabrous, perennial twinner. Leaves palmatifid into 5 segments; basal pair of segment again lobed or parted. Flowers usually 1-3 in axillary peduncled, large pale-purple or bluish-purple, campanulate. Corolla purple, funnel-shaped. Capsule subglobose or ovoid smooth; 4-seeded.

Common. Usually planted in colonies to cover up the fencing.

Flowering & Fruiting: Almost throughout the year.

Siddiqui 31352, Chandra Devi Shiksha Niketan.

5. **Ipomoea aquatica** Forsk. Fl. Aegypt. -Arab. 44, 1775; FBI. 4:210, 1883; FPP. 178, 1978.

Ipomoea reptans (Linn.) Poir in Lamk. Encycl. Suppl. 3:460, 1814; FUGP. 1:555, Repr. ed. 1960; Fl. Delhi 234, 1963.

Ipomoea aquatica Forsk.

Convolvulus reptans Linn. Sp. Pl. 158, 1753.

A floating or creeping, halophobous and amphibious herb, rooting at nodes, roots appear black after drying. **Stem** fistular, reddish or brownish. **Leaves** elliptic-oblong; cordate hastate at base, acute, long petioled. **Flowers** axillary, 1-5 in cymes. **Corolla** pink to purple with a dark centre. **Seeds** triangular with a distinct scar.

Commonly found in ponds and their edges.

Ethnobotanical use:

Juice of the leaves is used in liver complaints.

Flowering & Fruiting: Auguat-December.

Local Name: 'Nali'

Siddiqui 31418, Madia.

6. Ipomoea arachnosperma Welw. Apont. Phytogeogr. 588, 1858 (1859); HFDD. 324, 1977.

Ipomoea pilosa Sweet, Hort. Brit. 289, 1827; FBI. 4:213, 1883; FUGP. 1:555, Repr. ed. 1960.

An annual twinning hirsute herb. **Stem** woody at the base. **Leaves** often with 2-3 triangular lobes, ovate-cordate, silvery-white below, hairy above with bulbous base hairs, petioled. **Flowers** in few flowered axillary cymes. **Sepals** 5-linear-lanceolate, hirsute. **Corolla** tube campanulate, pink. **Seeds** ovoid-globose, dark-brown, woolly-tomentose.

Common in sugarcane fields.

Flowering & Fruiting: Rainy and winter season.

Siddiqui 31458, Charouli.

7. Ipomoea fistulosa Mart. ex Choisy in DC. prodr. 9:349, 1845 (Jan); Ooststr. in Fl. Males. (Ser. 1). 4:509, 1954; Backer & Bakh f. Fl. Jawa 2:493, 1965.

Ipomoea crassicaulis (Benth.) Robinson, in Proc. Amer. Acad. Arts. & Sci. 51:530, 1960; Ooststr. in Blumea 3:569, 1940 & Fl. Males (1) 4:485, 1954; Santapau & Patel in Trans. Bose Res. Inst. Cal. 22:40, 1945; Raizada in Ind. For. Rec. (n. s.) Bot. 5(1):23, 1950.

Batatas crassicaulis Benth. Voy. Sulph. 5:134, 1845 (Apr).

Ipomoea cornea auct. non. Jacq.

This species can be readily distinguished from other species of *Ipomoea* by its erect or ascending habit; milky latex, woody base; ovate cordate leaves with slightly wavy margins and long petioles; large pink or purplish flowers in many flowered axillary and terminal cymes.

Abundant, often used for hedging and fencing purposes, also found as an escape.

Flowering: Round about the year.

Siddiqui 31486, Sadai behta.

LXXIV. SOLANACEAE

Key to Genera:

Corolla campanulate; anthers free, longitudinally dehescent.

Fruit a berry, indehiscent;

Calyx accrescent and enclosing the fruit:

Flowers in umbellate cymes; plants covered with candelabra hairs .....1. *Withania*

Flowers solitary axillary; plant not covered with candelabra hairs .....2. *Physalis*

Fruit a capsule, dehiscent;

Viscid glandular - pubescent plants;

Calyx partly covering the fruit.....3. *Nicotiana*

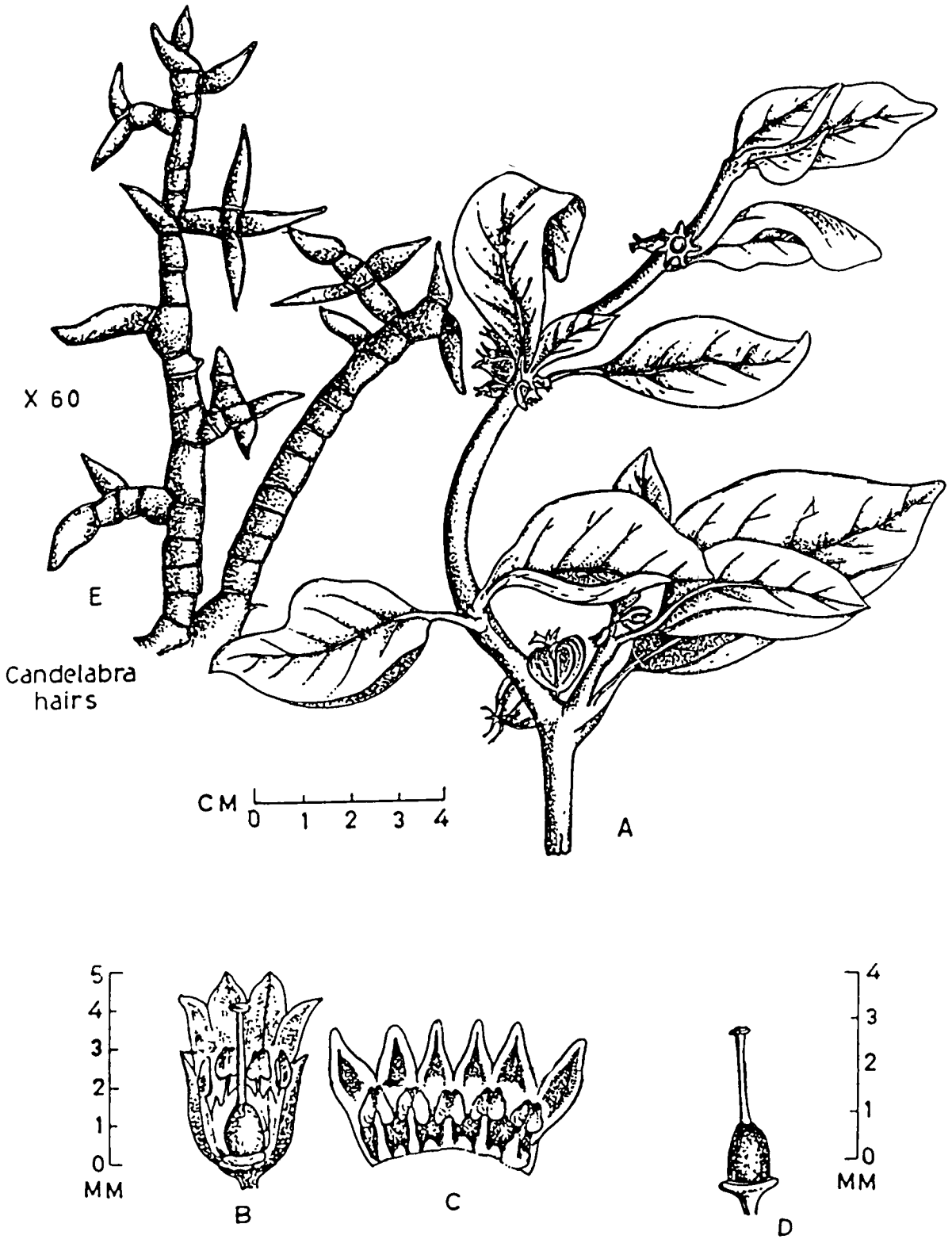
Eglandular; calyx reflexed in fruit .....4. *Datura*

Corolla rotate; anther connivent, poricidaly dehiscent .....5. *Solanum*

1. **Withania** Paquy, nom. cons.

Withania somnifera (Linn.) Dunal, in DC. Prodr. 13(1):453, 1852; FBI. 4:239, 1883; FUGP. 2:6, Repr. ed. 1960; FPP. 187, 1978.

Withania somnifera (Linn.) Dunal
A. Flowering branch, *B.* Flower, *C.* Stamens with petals, *D.* Pistil, *E.* Candelabra hairs.



Withania somnifera (Linn.) Dunal

Physalis somnifera Linn. Sp. Pl. 182, 1953.

Physalis somnifera Link. Royl. I 11. 279.

Physalis flexuosa Linn. Sp. Pl. 182, 1753.

Erect, perinnial under shrub, nearly all parts covered with candelabra hairs; branches flexuous, terete, densely tomentose. Leaves petioled, elliptic-ovate, sub-acute; base acute usually unequal; main lateral nerves 5-7 pairs. Flowers greenish-yellow, 5-8 together in subsessile, umbelliform cymes; pedicels short. Sepals 5, connate, densely pubescent with candelebra hairs, accrescent in fruit. Petals 5-toothed; outer upper part hairy rest glabrous; there are 5 cushion like hairy structures alternating with the petals and the stamens are inserted thereon. Anthers sometimes hairy. Fruit globose, red when ripe and glabrous.

Common in waste places and dry soils.

Ethnobotanical uses:

Plant is used as tonic, alterative, pungent, astringent, aphrodisiac and in rheumatism, cough, dropsy, consumptions etc. The leaves moistened with a little warm castor oil are useful in external application in case of carbuncle.

Flowering & Fruiting: Almost round the year.

Local Name: 'Asgandha'

Siddiqui 31319, Asgaon.

2. **Physalis** Linn.

key to species:

Anthers blue or violet:

Stems, petioles, lamina and pedicel nearly glabrous; corolla with five small, often obscure brown spot inside, leaves coarsely irregular inside serrate .....1. *P. angulata*

Stem, petioles, lamina and pedicel densely glandular pubescent; corolla with 5 large, brown spots inside, leaves subentire-sinuate to dentate .....2. *P. peruviana*

Anthers yellow:

Leaves sinuate - dentate, fruiting calyx 5-angled .....3. *P. minima*

1. **Physalis angulata** Linn. Sp Pl. 183, 1753; Waterfall, Rhodora 60:162, 1958; Gleason, New Brit. & Brown I 11 Fl. N. E. U. S. & Canada 3:197, 1963; HFD. 337, 1977.

Physalis longifolia auct. pl. (Non. Nutt. 1837); Santapau *et al*, Journ. Bomb. Nat. Hist. Soc. 58:551, 1961.

An erect, often much branched annual herb. **Stem** predominantly angular-ribbed, often decumbent and rooting below. **Leaves** ovate-elliptic, glabrous, long acuminate, sinuate-dentate. **Flowers** solitary-axillary, light yellow, nodding. **Calyx** glabrous large accrescent. **Corolla** yellow with 5 small, faint, brown spots

inside, glabrous. **Anthers** violet or bluish-purple. **Fruit** a globose to elliptic berry, greenish yellow.

Commonaly found in waste places along road sides and river beds.

Flowering: June-August; **Fruiting:** September-November.

Siddiqui 31395, Bhura tikku.

2. **Physalis peruviana** Linn. Sp. Pl. ed. 2. 167Ø. 1763; FBI. 4:238, 1883; Waterfall Rhodora 6Ø:141, 1958; HFDD. 338, 1977.

An erect, glandular pubescent, perennial herb. **Stem** fistular, often decumbent and rooting below, often tinged with dark purple, patent villous. **Leaves** ovate-cordate, with unequal, cordate-cuniate base or acuminate, subentire-sinuate to dentate, glabrous pubescent. **Flowers** nodding, pedicels patent pubescent. **Calyx** divided halfway down; lobes ovate, acuminate. **Corolla** yellow, with 5 large, brwon spots inside, pilose outside, lobes ovate-triangular, obtuse. **Filament** slender, uniform throughout, glabrous. **Fruit** ellipsoid, yellow. **Fruiting** calyx 5-angled.

Common in sugarcane fields and waste places.

Ethnobotanical uses:

Fruit is considered to be diuretic, purgative and tonic.

Flowering & Fruiting: December-January.

Local Name: 'Jungali rasbhari'

Siddiqui 31589, Chak.

3. **Physalis minima** Linn. Sp. Pl. 183, 1753; FBI. 4:238, 1883; FUGP. 2:5, Repr. ed. 196Ø; HFDD. 338, 1977.

A prostrate or erect herb. **Stem & branches** striate, covered with

patent hairs. **Leaves** oblong-ovate, entire or distantly creanate, pilose. **Flowers** solitary, axillary, yellow. **Calyx** persistent. **Corolla** yellow campanulate, usually with 5 basal spots inside. **Anthers** yellow with bluish margins. **Berry** yellowish enclosed in papery calyx tube.

Common in waste places.

Flowering: August-October; **Fruiting:** September-October.

Siddiqui 31427, Bhul bhuliya.

3. **Nicotiana** Linn.

Key to species:

Anthers subsessile, a road side weed.....1. *N. plumbaginifolia*

Anthers with long filament, a cultivated crop plant .....2. *N. tabacum*

1. **Nicotiana plumbaginifolia** Viv. Elench. Pl. Hort. Bot. 26. t. 18Ø2; HK. f. in FBI. 2:246, 1883; Raizada in Journ. Ind. Bot. Soc. 35:163, 1935; Goodspeed *et al*, Chron. Bot. 16(1/6):4Ø3, 1954; Suppl. FUGP. 17Ø, 1976; HFDD. 335, 1977; FPP. 184, 1978.

An erect viscid glandular-pubescent herb. **Stem** scapose, cylinderical, solid. **Leaves** radical, forming a basal rosette, petiolet, broadly obovate, oblong, glandular hairy, margins often undulate, apex obtuse, base cuniate; cauline leaves few, sessile. **Flowers** in clusters. **Calyx** 5-partite; lobes glandular, slightly reflexed. **Corolla** tube long plicate in bud, glandular hairy, white with a purple tinge. **Anthers** subsessile. **Fruit** a glabrous, ovate capsule.

Commonaly found in waste places, along road side ditches and canal banks.

Flowering: October-December; March-May; **Fruiting:** February-March; June-August.

Siddiaui 31258, Jhala.

Plants associated: *Sida cordifolia*, *Eclipta prostrata*, *Alternanthera sessilis* etc.

2. **Nicotiana tabacum** Linn. Sp. Pl. 180, 1753; FBI. 4: 245, 1883; Goodspeed *et al*, Chrom. Bot. 16:372, 1954; HFDD. 335, 1977.

This is cultivated species and can be distinguished from the preceding species by its thicker and woody stem; larger leaves; yellowish flowers and stamens with filaments.

It is cultivated with the permission of Excise Department.

Ethnobotanical uses:

Plant is used in skin diseases and rheumatism. Slightly hot decoction of the dry leaves and stem is used in earache, its paste is applied over the wounds as an antiseptic.

Flowering: November-March; **Fruiting:** April-May.

Local Name: 'Tambakhu'

Siddiqui 31548, Hasia.

4. **Datura** Linn.

Key to species:

Fruit erect, oblong; dehiscent by 4-valves. Calyx angular .....1. *D. stramonium*

Fruit deflexed, globose; dehescent irregularly. Calyx subterete .....2. *D. metel*

1. Datura stramonium Linn. Sp. Pl. 179, 1753; FBI. 4:242, 1883 (incl. var. *tabula* Clarke); FUGP. 2:8, Repr. ed. 1960; Safford. Journ. Wash Acad. Sci. 11:173-189, 1921; DeWolf f. Baileya 4:17, 1956; Satina & Avery, Gen. Datura, 18, 1959; HFDD. 333, 1977.

Datura tabula Linn. Sp. Pl. ed. 2. 256, 1762; FUGP. 2:8, Repr. ed. 1960.

Datura enermis Jacq. Hort.Vindop. 3:44. t. 82, 1767.

An erect branched annual; stamens glabrous or puberulous on younger parts. Leaves long, petioled; entire, acute, base unequal sided. Flowers long on stout pedicel. Calyx 5-angled, green. Corolla white or purple, lobes shortly acuminate. Fruits covered with prickles.

Occasionally found on waste lands.

Ethnobotanical use:

Juice of the fruit is applied to the scalp for dandruff.

Flowering: July-October; **Fruiting:** November-December.

Local Name: 'Dhatura'

Siddiqui 31496, Sadai behta.

2. Datura metel Linn. Sp. Pl. 179, 1753 (non auct. pl. Ind. Fl.); Safford, Journ. Wash. Acad. Sci. 11:178, 1921; Satina & Avery, Gen. Datura 32, 1959; HFDD. 332, 1977.

Datura alba Nees, Trans. Linn. Soc. Lond. 17:73, 1837; FUGP. 2:9,

Repr. ed. 1960.

Datura fastuosa Linn. Syst. Nat. ed. 10. 1932, 1759; FBI. 4:242, 1883; FUGP. 2:9, Repr. ed. 1960.

Erect, branched annual herb, with a foetid smell. Stem shortly hairy, lenticellate, often purple. **Leaves** long, petioled, ovate, triangular, obliquely rounded at the base. **Flowers** longer than the *Datura stramonium*. **Calyx** subterete. **Corolla** white or purple; *lobes with long acumens*. **Fruit** *nodding, covered with conicle* prickles. **Seeds** red, flat.

Commonaly found in waste places.

Ethnobotanical uses:

The plant is used in fever, skin diseases, boils, itches, worm, insanity. Paste of the seed placed to the teeth for toothache. The roasted leaves applied to the eyes give relief in ophthalmia, similarly they are useful in headache, in large testicles, boils etc.

Flowering: November-January; **Fruiting:** January-April.

Local Name: 'Dhatura'

Siddiqui 31567, Baturi purva.

Plants associated: *Withania somnifera, Verbena officinalis, Saccharum* sp.

5. Solanum Linn.

Key to species:

A tuberous herb .....1. *S. tuberosum*

Non-tuberous, herb or shrubs.

Armed plants.

A prostrate herb with violet flowers .....2. *S. surattense*

Erect herbs or shrubs; bi-sexual and male flowers on the same plants; berry dull yellow .....3. *S. incanum*

Unarmed plants.

A small tree with violet flowers .....4. *S. grandiflorum*

Herbs or shrubs with white flowers.

Densely tomentose large herb .....5. *S. erianthum*

Glabrous small herb; flowers occassionally with purple tinge .....6. *S. nigrum*

1. Solanum tuberosum Linn. Sp. Pl. 282, 1753; Correll, U.S. Dept. Agri. Monogr. n. 11. 1-243, 1952; HFDD. 342, 1977.

Erect ascending herb with underground stolons, which bear tubers at their ends. Tubers vary in size, skin thickness and colour from variety to variety. Leaves imparripinnate, pairs of smaller and larger leaflets alternating each other. Flowers not seen.

Solanum surattense Burm. f.

An important vegetable crop.

Siddiqui 31229, Etouli.

2. Solanum surattense Burm. f. Fl. Ind. 57, 1768; Santapau in Rec. Bot. Surv. Ind. 16:154, 1958; Raizada, Ind. For. 92(5):323, 1966; HFDD. 341, 1977; FPP. 187, 1978.

Solanum xanthocarpum Schrad. & Wendl. Sert. Hannov. 1:8. t. 2, 1795; FBI. 4:236, 1883; FUGP. 2:3, Repr. ed. 1960.

Readily identifiable by its prostrate habit, long yellow spines all over the plant body. Leaves sub-pinnatifid; violet flowers, berry globose, yellow with white streaks.

Abundant, prefers sandy soils.

Ethnobotanical uses:

Decoction of the root is used as asperient, pungent, digestive, diuretic, astringent and anthelmintic; usefull in fever, cough, asthma and heart diseases. Fumigation with the vapour of the burning seeds are high repute in the cure of toothache.

Flowering & Fruiting: Round about the years.

Local Name: 'Neeli kateli'

Siddiqui 31472, Asgaon.

3. Solanum incanum Linn. Sp. Pl. 188, 1753; Cooke Fl. Bomb. 2:267, FUGP. 2:4, Repr. ed. 1960; FPP. 186, 1978.

Solanum coagulans Forsk. Fl. Aegypt. -Arab. 46; FBI. 4:236, 1883.

Solanum melongena sensu. Clarke FBI. 4:235, 1883 (pro parte).

Distinguishable from the other species by the presence of hairs, erect habit, leaves sinuate lobed, presence of male and bisexual flowers on the same plant; berry yellow.

Common in waste places.

Flowering & Fruiting: January-June.

Siddiqui 31241, Kundouli.

4. Solanum grandiflorum Ruiz & Pav. Fl. Peruv. 2:35. t. 168, 1799; Fl. Delhi 244, 1963.

A small soft wooded tree; younger parts sticky, sparsely thorny. **Leaves** large, broadly ovate, sinuate lobed, stellately hairy, with few prickles along the nerves. **Flowers** violet with white blotches. **Fruit** a globose berry.

Planted as an ornamental.

Flowering & Fruiting: Throughout the year.

Siddiqui 31295, Jhala.

5. **Solanum erianthum** D. Don, Prodr. 96, 1825; Roe, Brittonia 19:358, 1967; Taxon 17:176-178, 1968; HFDD. 339, 1977.

Solanum verbascifolium auct. Pl. (non Linn. 1753); FBI. 4:230, 1883; FUGP. 2:2, Repr. ed. 1960.

A soft wooded erect, large shrub, densely tomentose; tomentum stellate. **Leaves** large, ovate, oblong, acute, cuniate, petiolate, mostly entire, may be shallowly sinuate. **Flowers** nodding in many flowered, corymbose cymes, dirty white. **Calyx** densely tomentose. **Corolla** white, stellate hairy outside. **Fruit** not seen.

Commonaly found within the area especially on banks near water.

Flowering & Fruiting: Rainy and Winter season.

Siddiqui 31419, Madia.

6. Solanum nigrum Linn. Sp. Pl. 186, 1753; FBI. 4:229, 1883; FUGP. 2:2, Repr. ed. 1960; HFDD. 340, 1977.

An erect, glabrous, glaucous herb. **Stem** often tinged with purple. **Levaes** petiolate, cuniate, sinuate or entire, acute. **Flowers** in extra-axillary, few flowered cymes. **Corolla** white, sometimes purple tinged. **Stamens** forming a cone; anthers yellow, dehiscence apical. **Berry** red to violet.

The morphology of this taxon varies to great extent, depending on the ploidy. Hence it is called as *Solanum nigrum* complex.

A very common weed within the area.

Ethnobotanical uses:

Leaves are cooked as vegetable and taken in case of inflammation to the any part of the body. This plant is used in dropsy, skin diseases, piles, fever, gonorrhoea, inflammatory swellings and lever complaints.

Flowering & Fruiting: Throughout the year.

Local Name: 'Makoi'

Siddiqui 31275, Mama purva.

The folowwing plants are commonaly cultivated within the area.

1. Petunia Juss.

Petunia hybrida Vilmor. Fl. Pl. Terr. ed. 1:615, 1875; Fries.

Kungl. Svenska Vet. -AK. Handl. 46:1-72, 1911; Man. Cult. Pl. 879, 1949; HFDD. 336, 1976.

Erect or ascending, viscid annular herb. **Stem** terete, simple or branched. **Leaves** sessile, elliptic-lanceolate or obovate, with a cuniate decurrent base, acute-obtuse, the leaf size reduces from base to the top. **Flowers** variously coloured, white, red, pink, violet or blotched. **Corolla** lobes 5, rounded, unequal, glandular hairy. **Fruit** a dehiscent capsule. **Seeds** many.

Flowering & Fruiting: March-May.

2. **Lycopersicon** Mill.

Lycopersicon esculentum Mill. Gard. Dict. ed. 8. n. 2, 768; FBI. 4:237, 1883; Terr. in Taxon. 26(1):129-131, February 1977.

Lycopersicon lycopersicum (Linn.) Karsten, Deutschl. Fl. 1966, 1980-1983; W. F. Wight. Contrib. U. S. Nat. Herb. 9:312, 1905; Backer & Bakh, f. Fl. Jawa 2:477, 1965; Suppl. FUGP. 169, 1976; HFDD. 333, 1977.

Solanum lycopersicum Linn. Sp. Pl. 185, 1753.

An erect decumbent-ascending or rambling, strongly aromatic, glandular hairy, much branched herb or under shrub. **Stem** obtusely angled, usually thickened on the nodes, often rooting below. **Leaves** 1-2 pinnatifid or partite, **segments** ovate-lanceolate, cuniate, rounded at the base, **irregulary dentate. Flowers** yellow in few or many, flowered cymes, decurved. **Berries** red or yellow pulpy.

Cultivated for its fruits.

Flowering & Fruiting: During cold season.

The correct name of tomato has long been a matter of much discussion. I have followed Terrell (Col. Cit.) and adopted *Lycopersicum esculantum* Mill. as correct name of tomato.

3. **Capsicum** Linn.

Capsicum annuum Linn. Sp. Pl. 188, 1753; Smith & Heiser, Amer. Journ. Bot. 38:362-368, 1951; Gull. Torrey Bot. Cl. 84:413-420, 1957; HFDD. 331, 1977.

An important economic crop, cultivated for the sake of fruits (Chillies).

Flowering & Fruiting: Summer and Rainy season.

4. **Cestrum** Linn.

Cestrum nocturnum Linn. Sp. Pl. 191, 1753; Bailey, Man. Cult. Pl. 874, 1949; Francey, in Candollea 7:67, 1936; Bor & Raizada in Beaut. Ind. Shrb. & Climb. 119. f. 76. t. 45, 1954; Baker & Bakh, f. Fl. Jawa 2:479, 1965; Raizada in Suppl. FUGP. 168, 1976.

An erect, profusely branched, large shrub, dark green. Leaves petiolate, glabrous, broadly ovate to oblong, acute, cuniate. Flowers greenish-yellow in axillary and terminal, much branched cymes. Corolla lobes erect at full anthesis. Fruit a purple-black, many seeded berry.

Common cultivated in houses and gardens for its fragrant flowers. The flowers emit a strong fragrance at night.

Flowering: Mostly in rainy season; **Fruiting:** Winter season.

Cestrum parqui L'Herit.

5. **Cestrum parqui** L'Herit. stipr. Nov. 73, 1785; Bailey, Man. Cult. Pl. 874, 1949; FPP. 183, 1978.

Differs from the preceding species in having oblong-lanceolate leaves. **Flowers** creamy, nearly **sessile** in axillary, long peduncled, umbellate cymes. **Corolla** reflexed at full anthesis. **Seeds** compressed, on face with depression.

Cultivated for ornamental purposes.

Flowering & Fruiting: June-January.

Local Name: 'Din ka raja'

LXXV. SCROPHULARIACEAE

Key to Genera:

Sepals nearly similar.

Flowers yellow.

Corolla rotate; filaments bearded; plants with pungent smell and radical leaves .....1. *Verbascum*

Corolla bilabiate.

Whole plant glabrous except upper part; leaves narrow; capsule opening by apical pores; cultivated .....2. *Antirrhinum*

Whole plant hairy; capsule not opening by apical pores; leaves ovate; always growing on walls .....3. *Lindenbergia*

Flowers otherwise.

Corolla rotate.

Corolla throat not bearded; fruit 2-lobed .....4. *Veronica*

Corolla throat bearded; fruit globose, ovoid .....5. *Scoparia*

Corolla bilabiate.

Marshy or aquatic herbs with dimorphic leaves ..... 6. *Limnophila*

Plant not marshy (some species of *Lindernia* grow in paddy fields, do not have dimorphic leaves).

Fertile stamens 2.

Leaves small, glabrous; capsule valves 2-partite ..... 7. *Dopatrium*

Leaves well-developed; capsule entire ..... 8. *Lindernia*

Fertile stamens 4.

Plants partially parasitic scabrid, turning blue-black on drying; flowers white ..... 9. *Striga*

Plant non-parasitic, non - scabrid, not blue - black on drying; flowers white with yellow streaks on lower lip ..... 10. *Mazus*

Sepals not similar; 2 linear and 3 broad.

Flowers yellow; leaves ovate, turning black on drying, not pellucid punctate.....*11. Adenosma*

Flowers bluish; leaves not turning black on drying, succulent, pellucid punctate.....*12. Bacopa*

1. **Verbascum** Linn.

Verbascum chinensis (Linn.) Santapau in Fl. Pur. 90, 1958; Santapau in Rec. Bot. Surv. Ind. ed. 3. 16:177, 1967; HFDD. 362, 1977.

Scrophularia chinensis Linn. Mant. 2:250, 1771.

Verbascum coromandelianum (Vahl) O. Kuntze, Rev. Gen. Pl. 1:468, 1891; Penn. Acad. Nat. Sci. Philad. Monogr. 5:39, 1943.

Erect, simple or branched, annual herb. **Stem** often branched from the base, glandular-pubescent downwards, gland hairy upwards. **Lower leaves** patioled, crowded, lyrate, pinnatifid; the large terminal lobe usually oblong, gland dotted. **Cauline leaves** sessile, irregularly serrate, acute. **Flowers** pedicelled; in simple or branched racemes, which contribute to nearly half of the part's length bracts leafy, sessile with cordate base and serrate margins, hairy, longer than the pedicel. **Calyx** shorter than the pedicel, deeply divided, segments linear-oblong, hairy, entire, sub acute, hairs of two types, longer simple and shorter granular; gland dotted. **Corolla** yellow and glandular hairy outside, subrotate. **Stamens** 4; anthers reniform; filaments bearded with white glandular hairs.

Common on waste lands and sandy river beds.

Ethnobotanical uses:

The plant is used as a sedative and astringent in diarrhoea. Leaves juice are administered in skin eruptions and dysentery.

Local Name: 'Phulla'

Flowering & Fruiting: Summer season.

Siddiqui 31428, Bhul bhuliya.

2. **Antirrhinum** Linn.

Antirrhinum orontium Linn. Sp. Pl. 617, 1753; FBI. 4:253, 1884; FUGP. 2:60 Repr. ed. 1960; HFDD. 345, 1977.

Erect, ascending, simple or branched, glandular hairy, annual herb. **Stem** often much branched from the base, glabrous downwards, glandular hairy upwards. **Leaves** linear, subsessile, entire, acute; tip hayline; margins revolut; lower opposite, upper alternate. **Flowers** solitary-axillary, passing into terminal racemes; white, purplish. **Calyx** with 5-segments, posterior segment is the largest and anterior two are smallest, hairy with simple and gland tipped hairs. **Corolla** bilabiate, saccate at base. **Stamens** 4, didynamous; filaments glandular hairy at base. Ovary densely gland pubescent. **Fruit** an obliquely ovoid capsule, opening by pores. **Seeds** dark brown to black.

Abundant on road sides and fields.

Flowering: January-April; **Fruiting:** March-April.

Siddiqui 31230, Etouli.

Lindenbergia indica (Linn.) O. Kuntze

3. Lindenbergia Lehm.

Lindenbergia indica (Linn.) O. Kuntze., Rev. Gen. Pl. 462, 1891; Santapau Journ. Bomb. Nat. Hist. Soc. 49:45, 1950; HFDD. 350, 1977.

Dodartia indica Sp. Pl. 633, 1753.

Stemodia ruderalis Retz. Observ. Bot. 5:25, 1789.

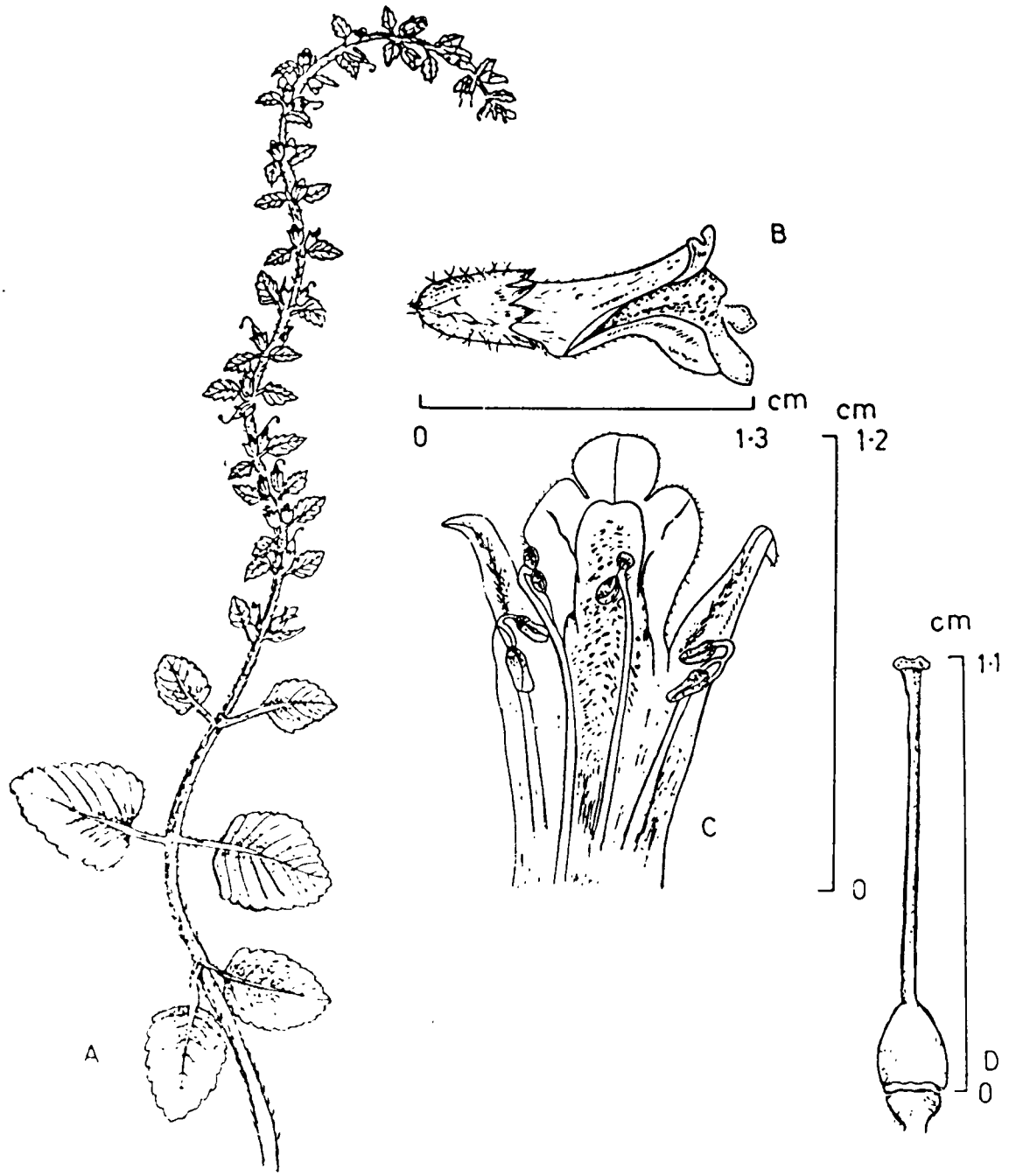
Lindenbergia ruderalis (Retz.) Voigt, Hort. Suburb. Calc. 501, 1845.

Lindenbergia urticaefolia Lehm. in Link. & Otto, Ind. Sem. Hort. Berol. 5, 1829(1830); FBI. 4:261, 1884; FUGP. 2:33, Repr. ed. 1960.

Lindenbergia polyantha Royle ex Benth. Scroph. Ind. 22, 1835; FBI. 4:262, 1884; FUGP. 2:33, Repr. ed. 1960.

Erect or decumbent-ascending, simple or branched annual herb. Stem patently glandular hairy often purple tinged. **Leaves** broadly ovate, creanate-serrate (only in upper half, basal half entire); base obtuse; glandular, pubescent on both surfaces. **Flowers** in unilateral racemes, shortly pedicelled. **Calyx** 5-nerved, densely villous (both within and without), lobes triangular, oblong, obtuse. **Corolla** a small, yellow, 2-liped; upper liped notched and inner in the bud; lower lip plicate transversely, the folds glandular hairy; there are also two longitudinal rows of yellow glandular hairs; tinged with red. **Stamen** 4, didynamous; anthers lobes separate. In atleast two stamens the anther lobe are on unequal heights.

Lindenbergia indica (Linn.) O. Kuntze
A. Flowering branch, *B.* Flower in lateral view,
C. Corolla cut open, *D.* Gynoecium.



Lindenbergia indica (Linn) O. Kuntze

Common found on the old building walls.

Ethnobotanical uses:

Juice of the leaves is given in chronic bronchitis, and its juice mixed with coriander is applied to skin eruptions.

Flowering: February-May; **Fruiting:** April-June.

Local Name: 'Dohriaya'

Siddiqui 31276, Mamapurva.

4. **Veronica** Linn.

Key to species:

A prostrate herb; leaves cordate-ovate or orbicular; flowers solitary axillary..1. *V. agrestis*

An erect herb; leaves oblong or linear oblong; flowers in racemes ..2. *V. anagallis-aquatica*

1. **Veronica agrestis** Linn. Sp. Pl. 13, 1753; FBI. 4:294, 1884; FUGP. 2:28, Repr. ed. 1960; HFDD. 363, 1977.

A prostrate or decumbent-ascending, hairy, annual herb. **Stem** patently white-hairy. **Leaves** oblong-ovate, subsessile, petiolate, crenately serrate, broadly obtuse to rounded. **Flowers** solitary axillary. **Corolla** light blue to white with blue veins. **Stamens** 2, slightly exerted. **Fruit** globose capsule, deeply emarginate at apex. **Seeds** tuberculate.

Common on road sides and in fields.

Flowering: November-May; **Fruiting:** December-June.

Siddiqui 31568, Baturi purva.

2. **Veronica anagallis-aquatica** Linn. Sp. Pl. 12, 1753; FBI. 4:293, 1884; FUGP. 2:28, Repr. ed. 1960; HFDD. 364, 1977; FPP. 193, 1978.

Erect or decumbent-ascending, similar or branched annual herb, growing best near water bodies. **Leaves** opposite, oblong, subentire, crenate. **Flowers** in axillary racemes. **Corolla** white expanded; lobes rounded. **Stamens** 2, erect. **Capsule** gland, ciliate emarginate at apex.

Abundant, found near drainage, ditches etc.

Flowering: December-April; **Fruiting:** March-April.
Siddiqui 31600, Asgaon.

5. **Scoparia** Linn.

Scoparia dulcis Linn. Sp. Pl. 116, 1753; FBI. 4:289, 1884; FUGP. 2:27, repr. ed. 1960; Penn. Acad. Nat. Sci. Philad. Monogr. 22, 1943; HFDD. 359, 1977.

An erect branched, annual-perennial herb, often with a woody base. **Stem** angular, ribbed, glabrous. **Leaves** oblong-ovate, crenate-serrate; petiolate, pellucid, punctate on lower surface. **Flowers** 1-3 in the axils of upper leaves, white. **Sepals** 4. **Corolla** expanded with bearded throat. **Capsule** globose.

Common on waste land, old building walls etc.

Flowering & Fruiting: Throughout the year.
Siddiqui 31320, Asgaon.

6. **Limnophila** R. Br., nom. cons.

Key to species:

Flowers sessile, solitary or in short peduncled, head like spikes leaves oppoeite serrate .....1. *L. rugosa*

Flowers pedicelled, axillary, solitary, lower leaves in whorls, divided into several, widely patent, short narrow segments .....2. *L. indica*

1. **Limnophila rugosa** (Roth) Merr. Bur. Sci. Publ. Manila 9:466, 1917 (Interpr. herb Amboin. 1917); Penn. Acad. Nat. Sci. Philad. Monogr. 5:26, 1923; Philcox, Kew Bull. 24:135, 1970; HFDD. 350, 1977.

Herpestis rugosa Roth, Nov. Pl. Sp. 290, 1821.

Limnophila roxburghii G. Don, Gen. Syst. 4:543, 1838; FBI. 4:265, 1884.

Creeping erect, annual, strongly aromatic herb. **Stem** terete, creeping and rooting at the base, with erect branches often purple tinged; glabrous downwards, patent hairy towards the apex. **Leaves** opposite, ovate-elliptic to oblong, narrowed into a patiole with a decurrent base, subobtuse, shallowly serrate gland dotted beneath; nerves depressed above, prominent beneath. **Flowers** sessile in head like spikes. **Calyx** divided half way down, hairy. **Corolla** tube yellow, upper lip emarginate, lower lip 2-lobed.

Common in marshy and swampy localities.

Flowering & Fruiting: Septenber-November.

Siddiqui 31497, Sadai behta.

2. **Limnophila indica** (Linn.) Druce, Rep. Bot. Exch. Club. Brit. Isles 3:420, 1914; Penn. Acad. Nat. Sci. Philad. Monogr. 5:26, 1943; Philcox, Kew Bull. 24:115, 1970; HFDD. 349, 1977.

Hottonia indica Linn. Syst. Nat. ed. 10:919, 1759.

Limnophila gratioloides R. Br. Prodr. 42, 1810; FBI. 4:271, 1884; FUGP. 2:21, Repr. ed. 1960.

Erect or ascending herb, with terpentine smell; lower nodes rooting. **Leaves** slightly succulent, punctate, ovate, dentate, obtuse, sessile; lower leaves disected; only one lateral nerve prominent. **Epicalyx** 2-linear. **Calyx gland** pubescent. **Corolla** white with red longitudinal streaks on lower lip. **Stamens** 4; anthers cells distinct. **Capsule subglobose.**

Not uncommon, found near ditches or submerged in water.

Flowering & Fruiting: Winter season.

Plant associated with *Lindernia parviflora*, *Ottelia alismoides* etc.

Siddiqui 31569, Baturi purva.

7. **Dopatrium** Buch. -Ham. ex Benth.

Dopatrium junceum (Roxb.) Buch. -Ham. ex Benth. Scroph. Ind. 30. 1835; FBI. 4:274, 1884; FUGP. 2:22, Repr. ed. 1960; Penn. Acad. Nat. Sci. Philad. Monogr. 5:24, 1943; HFDD. 349, 1977.

Gratiola juncia Roxb. Pl. Cor. 2:16. t. 129, 1798.

Erect, glabrous, annual herb. **Stem** thick at the base, often branched from the base. **Leaves** sessile, ovate-lanceolate to

elliptic-oblong, obtuse, parallel nerved, higher ones smaller, passing into bracts. **Flowers** axillary, forming leafy, lax, terminal racemes; lower ones sessile, cleistogamous; higher ones perfect, pedicelled. **Fruit** ovoid-subglobose, apiculate with a persistent style base. **Seeds** minute, ellipsoid.

Common in rice fields.

Flowering & Fruiting: Rainy season.

Siddiqui 31434, Bara gaon.

8. **Lindernia** All.

Key to species:

Fertile stamens 2.

Capsules cylindrical.

Leaves densely serrate .....1. *L. ciliata*

Leaves subentire or remotely shallowly serrate .....2. *L. antipoda*

Capsule ellipsoid .....3. *L. parviflora*

Fertile stamens 4.

Capsule shorter or as long as the calyx.

Calyx divided half way down or less .....4. *L. crustacea*

Calyx divided very near to the base .....5. *L. viscosa*

Capsule much longer than the calyx.....6. *L. nummularifolia*

1. **Lindernia ciliata** (Colsm.) Penn. Brittonia 2:182, 1936; Journ. Arn. Arb. 24:253, 1943; Mukerjee, Jour. Ind. Bot. Soc. 24:133, 1945; Philcox, Kew Bull. 22:51, 1968; HFDD. 353, 1977.

Gratiola ciliata Colsm. Prodr. Desc. Grat. 14, 1793.

Bonnaya brachiata Link & Otto, Ic. Pl. Select. 25. t. 11, 182Ø; FBI. 4:284, 1884; FUGP. 2:26, Repr. ed. 196Ø.

Erect, small, simple or branched from the base, annual herb. **Stem** decumbent and rooting at base, **4-angular**, glabrous except short-hersute angles. **Leaves** sessile, lanceolate-oblong or obovate, obtuse or rounded, nearly glabrous, acutely densely serrate with britle-tipped teeth. **Flowers** in 4-15 flowered racemes, pedicellate. **Calyx** keeled; segments linear-lanceolate, finely acuminate, ciliate. **Corolla** pink with red dots. **Capsule** cylindric, linear.

Common in agricultural fields.

Flowering & Fruiting: July-November.

Siddiqui 3153Ø, Saktapur.

2. **Lindernia antipoda** (Linn.) Alst. in Trim. Handb. Fl. Ceyl. Suppl. 6:214, 1931; Penn. Jcurn. Arn. Arb. 2Ø:81, 1939; ibid. 24:253, 1943, proparte; Philcox, Kew Bull. 17:484, 1964; ibid. 22:57, 196Ø; HFDD. 353, 1977.

Ruellia antipoda Linn. Sp. Pl. 635, 1753, pro maj. parte.

Gratiola veronicifolia Retz. Observ. Bot. 4:8, 1786.

Bonnaya veronicifolia (Retz.) Spreng. Syst. 1:41, 1821; FBI. 4:285, 1884; FUGP. 2:26, Repr. ed. 196Ø.

Lindernia verbenifolia (Colsm.) Penn. Acad. Nat. Sci. Philad. Monogr. 5:131, 1943.

Distinguishable from preceding species by large size, coarsely and distantly dentate leaves; corolla bluish.

Common in road side ditches.

Flowering & Fruiting: Rainy season.

siddiqui 31175, Bhaseta.

3. Lindernia parviflora (Roxb.) Haines, Bot. Bih. Orissa, 635, 1922; Penn. Acad. Nat. Sci. Philad. Monogr. 5:31, 1943; Mukerjee, Journ. Ind. Bot. Soc. 24:132, 1945; HFDD. 356, 1977.

Gratiola parviflora Roxb. Pl. Cor. 3:3. t. 203, 1819.

Ilysanthes parviflora (Roxb.) Benth. in DC. Prodr. 10:419, 1046; FBI. 4:283, 1884; FUGP. 2:25, Repr. ed. 1960.

Decumbent-ascending, often much branched, glabrous annual herb. Stem rooting below, 4-angled. Leaves sessile, ovate-lanceolate, with a rounded base, subacute, entire, glabrous, 3-nerved from the base, higher ones smaller, passing into bracts, lower larger. Flowers long pedicelled, solitary axillary. Corolla white. Stamens 2, staminodes 2, dentate.

Marshy and damp places.

Flowering & Fruiting: September-March.

Siddiqui 31483, Majhola.

4. Lindernia crustacea (Linn.) f. Muell. Syst. Cens. Austr. Pl. 97, 1882; Mukerjee, in Journ. Ind. Bot. Soc. 24:130, 1945; HFDD. 354, 1977.

Caprarıa crustaceae Linn. Mant. 87, 1767.

Vandellia crustacea (Linn.) Benth. Scroph. Ind. 35, 1835; FBI. 4:279, 1884; FUGP. 2:23, Repr. ed. 196Ø.

An erect or decumbent-ascending, glabrous, small herb. **Stem** slender, obscurely , 4-angled. **Leaves** opposite, short petioled, broadly ovate, shallowly toothed. **Flowers** in short terminal racemes, white. **Corolla** bilabiate. **Stamens** 4, all perfect. **Fruit** a capsule.

Common in cool and damp situations, road sides etc.

Flowering & Fruiting: August-November.

Siddiqui 31429, Bhul bhuliya.

5. Lindernia viscosa (Hornem.) Merr. Bur. Sci. Publ. Manila 12:14, 1918 (Sp. Blanc. 1918); Enum. Philipp. Flow. Pl. 3:439, 1923; Penn. Journ. Arn. Arb. 24:251, 1943; HFDD. 357, 1977.

Gratiola viscosa Benth. Scroph. Ind. 36, 1835; FBI. 4:28Ø, 1884.

Lindernia hirsuta (Benth.) Wellst. Pflanzenfam. 4. 3b:79, 1891; Mukerjee, Journ. Ind. Bot. Soc. 24:131, 1945.

Erect-ascending, somewhat flaccid, branched from the base, annual herb. **Stem** 4-angular. **Leaves** subsessile, petiole short, ovate, elliptic to rounded, obtuse, crenate-serrate, ciliate, thinly patently long hairy on both sides. **Flowers** in terminal racemes. **Corolla** white, upper lip brown. **Stamens** 4. **Capsule** globose.

Common in shady localities.

Flowering & Fruiting: September-November.

Siddiqui 31549, Hasia.

6. Lindernia nummularifolia (D. Don) Wettst. Pflanzenfam. 4. 3b:79, 1891; Penn. Acad. Nat. Sci. Philad. Monogr. 5:29, 1943; Mukerjee, Journ. Ind. Bot. Soc. 24:132, 1945; HFDD. 355, 1977.

Vandellia nummularifolia D. Don, Prodr. 86, 1825; FBI. 4:282, 1884; FUGP. 2:24, Repr. ed. 1960.

An erect-decumbent to ascending, annual herb. **Stem** often creeping and rooting below, 4-gonous, hairy on the angles. **Leaves** subsessile, ovate-rounded to suborbicular, obtuse or subacute at apex, crenate-serrate, glabrous. **Flowers** in 1 to 4 flowered, subumbellate racemes. **Corolla** whitish or tinged with purple, upper lip brown, lower lip white with a purple centre. **Stamens** 4. **Capsule** cylindrical, apiculate, glabrous.

Common in grassy and shady localities.

Flowering & Fruiting: September-November.

Siddiqui 31572, Chak.

9. Striga Lour.

Striga euphrasioides (Vahl) Benth. in Hook. Comp. Bot. Mag. 1:364, 1836; FBI. 4:299, 1884; FUGP. 2:31, Repr. ed. 1960; Penn. Acad. Nat. Sci. Philad. Monogr. 5:96, 1943; HFDD. 360, 1977.

Buchnera euphrasioides Vahl, Symb. Bot. 3:81, 1794.

A scabrid, simple or branched, erect annual, turns blue when dry. **Stem** ribbed. **Leaves** linear, narrowly oblong, acute, hispid; hair tubercle based. **Corolla** white, nearly glabrous.

Common in agricultural fields and grassland.

Flowering & Fruiting: October-January.

Siddiqui 31517, Atwa.

10. **Mazas** Lour.

Mazas pumilus (Burm. f.) Steen. Nova Guinea N. S. 9:31, 1958; HFDD. 358, 1977.

Lobelia pumila Burm. f. Fl. Ind. 186. t. 60. f. 3, 1768.

Lindernia japonica Thunb. Fl. Jap. 253, 1784.

Mazas rugosus Lour. Fl. Cochinch. 385, 1790; FBI. 4:259, 1884; FUGP. 2:19, Repr. ed. 1960.

Mazas japonicus (Thunb.) O. Kuntze. Rev. Gen. Pl. 462, 1891; Li, Brittonia 8:31, 1954.

A small, glabrous, dark green herb. **Leaves** mostly radical, spathulate, rounded at apex, coarsely dentate. **Flowers** in lax, flexuous racemes, pedicellate. **Calyx** lobes nearly triangular, persistent, acrescent, spreading in fruit. **Corolla** white, bilipped, with yellow streaks on lower lip. **Capsule** globose, hairy.

Abundant in shady and damp localities.

Flowering & Fruiting: November-April.

Siddiqui 31330, Hardoi.

11. **Adenosma** Br.

Adenosma javanicum (Bl.) Kds. Exkursionsfl. Java. 3:175, 1912; Fl. Java 2:506, 1965.

Herpestis javanica Blume, Bijd. 748.

Adenosma ovatum Benth. ex HK. f. in Gen. Pl. 2:949; FBI. 4:263, 1884.

Herpestis ovata Benth. Scroph. Ind. 30 and in Wall. Cat. 3896.

Pterostigma ovatum Benth. in DC. Prodr. 10:380, Miquel Fl. Ind. Bot. 2:678.

A prostrate herb, branching in all directions, turns black when dry. **Leaves** opposite in unequal pairs, patiole very short; elliptic-ovate, serrate, acute, base cuneate. **Flowers** solitary-axillary, pedicelled, pedicel equal to or longer than the corresponding leaf, elongating with the fruit maturation. **Sepals** 5, 3 outer large, foliaceous, with a distinct midrib and few lateral parallel nerves; 2 inner linear; persistent, accrescent. **Petals** yellow, bilabiate, slightly longer than the sepals. **Stamens** 4, didynamous; filaments slightly dilated at the base. **Stigma** with a shallow notch. **Capsule** septicidal. **Seeds** pale brown, with dark brown reticulation.

Flowering & Fruiting: February-March; March-April.
Siddiqui 31262, Bilgram Road.

12. **Bacopa** Aublet, nom. cons.

Bacopa monnieri (Linn.) Penn. Proc. Acad. Nat. Sci. Philad. 98:94, 1946; Philcox in Kew Bull. 33(4):679-680, 1979; HFDD. 346, 1977.

Lysimachia monnieri Linn. Cent. Pl. 2:9, 1756 (1755).

Gratiola monnieria Linn. Amoen. Acad. 4:306, 1759.

Gratiola monnieri Linn. Syst. Nat. ed. 10. 851, 1759.

Herpestis monnieria (Linn.) HBK. Nov. Gen. Sp. 2:366, 1818; FBI.

4:272, 1884; FUGP. 2:17, Repr. ed. 1960.

Bacopa monnieria (Linn.) Wettst. Pflanzenfam. 4. 3b:76, 1891.

Bramia monnieri (Linn.) Penn. Proc. Acad. Nat. Sci. Philad. 75:10, 1923; Acad. Nat. Sci. Philad. Monogr. 5:23, 1943.

A creeping, glabrous, succulent herb. **Rooting** at nodes. **Leaves** oblong-obovate, entire, cuneate, apex rounded; pellucid punctate. **Flowers** soliatry, bracteate, pedicelled. **Calyx** lobes unequal. **Corolla** two lipped, bluish. **Fruit** loculicidal capsule.

Rare, often found near water bodies.

Flowering & Fruiting: Rainy and winter season.
Siddiqui 31571, Chak.

Palnt associated: *Ludwigia adscendens*, *Rumex dentatus*, *Polygonum* sp. etc.

The following plants are commonly cultivated in gardens and parks.

1. *Antirrhinum majus* Linn. Sp. Pl. 617, 1753.

An annual, erect herb. **Stem** terete. **Leaves** oblong-lanceolate, basal ones larger, gradually reducing above. **Flowers** in terminal racemes, variously coloured, bilabiate, glandular-pubescent. **Fruit** an obliquely ovoid, paricidal capsule.

Flowering: December-January; **Fruiting:** March-April.
Siddiqui 31999, D.M. Lodge, Hardoi.

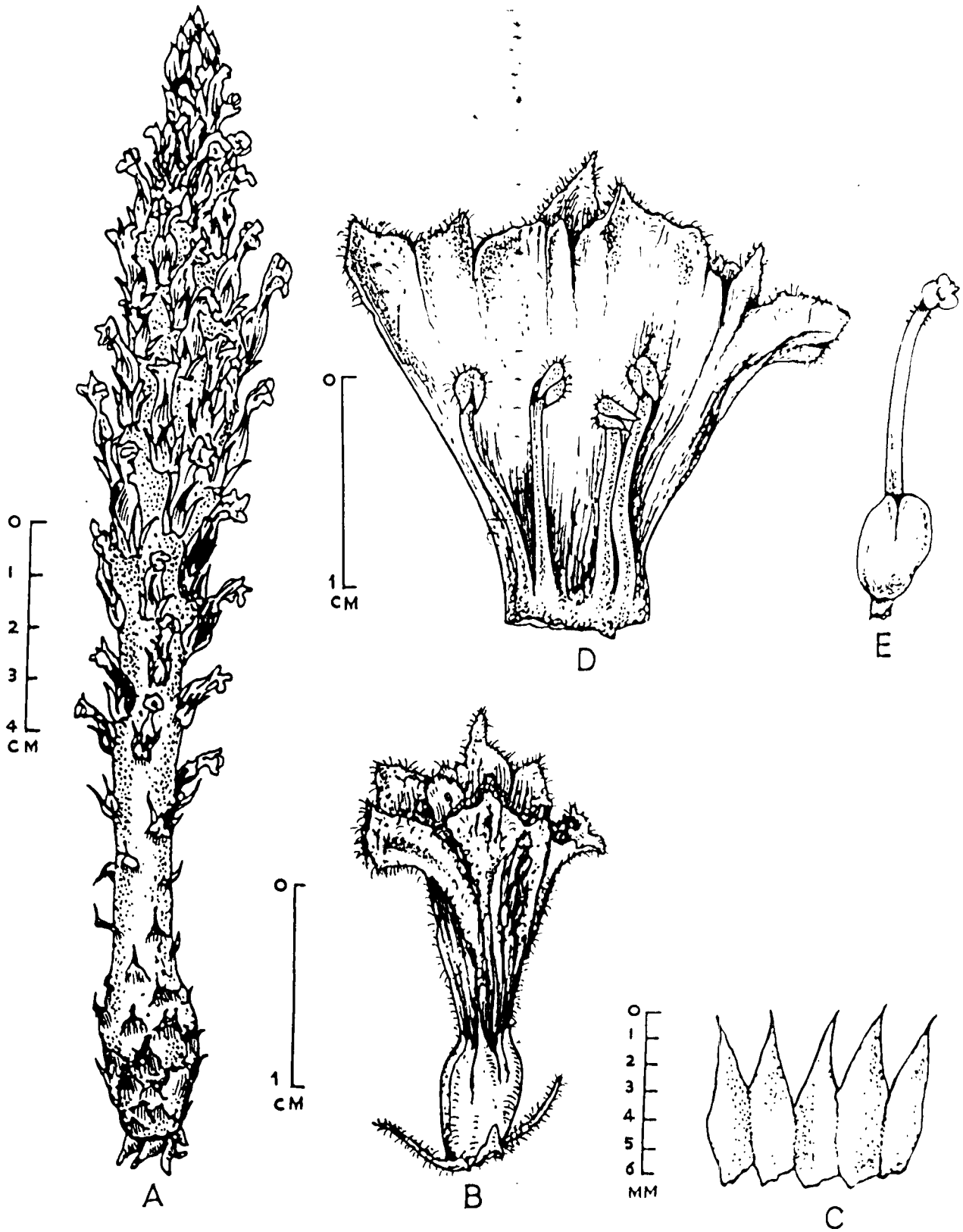
2. *Linaria maroccana* Hook. f. Bot. Mag. t. 5983, 1878; Bailey in Man. Cult. Pl. 896, 1949.

Annual herb, glandular-pubescent. **Leaves** opposite, narrowly linear. **Flowers** in long terminal racemes. **Corolla** bilabiate, long spurred, variously coloured, usually violet-purple, blotched with yellow. **Stamens** 4, didynamous. **Fruit** a globose capsule.

Flowering: December-January; **Fruiting:** March-April.

Siddiqui 31296, Hardoi.

Orobanche aegyptiaca Pers.
A. Plant, *B.* Flower, *C.* Calyx, *D.* Corolla and epipetalous stamens, *E.* Carpel.



Orobanche aegyptiaca Pers.

LXXVI. OROBANCHACEAE

Orobanche Linn.

Orobanche aegyptiaca Pers. Pl. 2:181, 1806; FUGP. 2:36, Repr. ed. 1960; HFDD. 366, 1977.

Orobanche indica Buch. -Ham. ex Roxb. Fl. Ind ed. Carey 3:27, 1832; FBI. 4:326, 1884.

A total root parasite. Stem simple, fleshy, thickened at base. Leaves scaly, membranous, ciliated, linear-lanceolate. Flowers bracteate in lax spikes. Sepals 4-5, connate, ciliated along margins. Petals 5, connate forming a bilabiate corolla, purple; throat yellowish, pubescent externally. Stamens 4, included; anthers basally apiculate. Ovary 1-celled; ovules numerous, placentation parietal; style 1; stigma funnel-shaped, grooved in the middle. Fruit a capsule. Seeds minute light-brown.

Common in cultivated fields.

Ethnobotanical use:

The decoction of the whole plant is used in diarrhoea.

Flowering & Fruiting: February-May.

Local Name: 'Kukarethi' or 'Billavwa'

Siddiqui 3104, Shah Nagar.

Plant parasitizes on *Brassica compestris*, *Solanum melongena* and *Alyssum marittimum* etc.

LXXVII. LENTIBULARIACEAE

Urticularia Linn.

Urticularia aurea Lour. Fl. Cochinch. 1:26, 1790; HFDD. 376, 1977.

Urticularia flexuosa Vahl, Enum. Pl. 1:198, 1804; FBI. 4:329, 1884; FUGP. 2:38, Repr. ed. 1960.

Submerged, aquatic insectivorous herb. **Bladder** subglobose, obliquely mouthed, darken in colour with the age. **Leaves** in whorls of four; segments filiform, pectinate. **Flowers** in 5-8 flowered erect racemes, yellow with red spots in the throat, bracteate. **Corolla** spurred, hairy outside, bilabiate. **Fruit** subglobose capsule, fruiting pedicel deflaxed. **Seeds** lenticular.

Commonly found in ponds and temporary road side ditches in rainy season.

Flowering & Fruiting: Rainy season.

Siddiqui 31473, Asgaon.

Plants associated: *Hydrilla verticillata*, *Typha angustata*, *Vellisneria spiralis* etc.

LXXVIII. BIGNONIACEAE

Key to Genera:

Climbers.

Tendril climbers:

Tendrils 3-partite; flowers tubular in pendullous corymbs .....1. *Pyrostegia*

Tendrils simple; flowers campanulate, in few flowered axillary racemes .....2. *Adenocalymma*

Root climbers .....3. *Campsis*

Trees are shrubs.

Leaves 2-pinnately compounds; flowers blue; fruits orbicular .....4. *Jacaranda*

Leaves 1-pinnately compound.

Fruits cylinderic.

Flowers deep violet; fruits gourd like on long stalks .....5. *Kigelia*

Flowers yellowish - purple; fruit coiled near apex .....6. *Haplophragma*

Fruits compressed.

Flowers yellow; a shrub .....7. *Tecoma*

1. Pyrostegia Presl.

Pyrostegia venusta (Ker-Gawl.) Miers in Proc. Royl. Hort. Soc.

3:188, 1863.

Bignonia venusta Ker-Gawl. in Bot. Rec. 3:t. 249, 1818; Bor & Raizada 3. t. 23. Pl. 6, 1954.

A large, much branched, spreading, perennial climber. Leaves 2-3 foliate (mostly 3 and pinnate); tendrils 3-fid, minutey clawed. Flowers in pendullous penicled cymes; bright-orange, tubular.

A very common and favourate climber for pargolas arches and covering the walls.

Flowering: December-March.

Siddiqui 31957, Bal Vidhya Mandir.

2. **Adenocalymma** Mart.

Adenocalymma allicea (Lamk.) Miers, in Proc. Royl. Hort. Soc. 3:185, 1863.

Bignonia allicea Lamk. Encycl. 1:421, 1792.

A much spraeding climber reaching 1Ø-15 m height. Leaves 2-3 foliate; leaflets oblong-ovate, glabrous, polished subcoriaceous give out garlic like smell on bruishing. Flowers in few flowered axillary racemes, showy, pink-mauve, trumpt-shaped.

Planted on parbolas, trellis and poles.

Flowering: August-October; **Fruiting:** No fruit setting has been observed.

Siddiqui 31951, Hardoi.

3. **Campsis** Lour.

Campsis grandiflora (Thunb.) K. Schum. in Engl. & Prantl, Nat.

Pflanzenfam. 4(3b):230, 1894; Bor & Raizada in Beaut. Ind. Climb. & Shr. 42, 1954; Chatterjee in Bull. Bot. Soc. Bengal 2:76, 1948.

Bignonia grandiflora Thunb. Fl. Japan 253, 1784.

Tecoma grandiflora Loisem, Herb. Amat. 5. t. 286, 1821.

An extensive, deciduous, root climber. **Stem** obtusely angled, smooth glabrous; bark thin, dark brown. **Leaves** odd pinnate; leaflets often unequal sided at the base, ovate, ovate-oblong or lanceolate, acuminate, coarsely dentate, glbrous. **Flowers** large, in terminal pendullous, racemose, penicles. **Calyx** campanulate, divided almost half way. **Corolla** bell-shaped, scarlet or orange; lobes rounded. **Stamens** included. **Fruit** a capsule. **Seeds** winged.

A very common climber. It rarely bears fruits in this area.

Flowering & Fruiting: March-December.

Siddiqui 3100б, Hardoi.

4. **Jacaranada** Juss.

Jacaranada mimosaefolia D. Don in Bot. Rec. t. 631, 1822 & Edinb. N. Phil. Journ. 9:266, 1823; Sand with in Kew Bull. 456, 1953; Blatt. & Mill. Beaut. Ind. Tr. 106. t. 22, 1936; Chaterjee in Bull. Bot. Soc. Beng. 77, 1948; FPP. 195, 1978 (*J. mimosifolia*).

Jacaranada ovalifolia R. Br. in Bot. Reg. t. 2327, 1822; Merr. Enum. 3:444, 1925.

Jacaranada acutifolia auct. (non. Humb. & Bonpl.).

A small or medium sized, decorative tree with a dense crowned, branching high above the ground. **Bark** grey-white to dull black.

Leaves compound, leaflets numerous, elliptic or sub-obliquely oblong. **Flowers** in axillary or terminal penicle, purple-blue, with yellowish-white throat. **Stamens** 4, didynamous; upper portion of the staminodes thickened and densely villous. **Fruit** a sub-orbicular, loculicidal capsule.

Commonaly planted in gardens and lawns.

Flowering 7 Fruiting: March-September.

Siddiqui 3196Ø, Homoeopathic Hospital.

5. **Kigelia** DC.

Kigelia pinnata DC. Prodr. 9:247, 1845; Benthall, Tr. Cal. 346, 1946; FPP. 195, 1978.

A medium sized, spreading, gark green tree. **Leaves** ternate, imparripinnate; leaflets 7-9, oblong-obovate, coriaceous; margins slightly undulate. **Flowers** in large pendullous, terminal racemes, deep violet, with pale-yellow streaks. **Fruit** indehiscent berry, pendullous, long stalked, resembles a large gourd.

Commonly planted on road sides and gardens.

Flowering & Fruiting: April-September.

Siddiqui 31Ø12, Hardoi.

6. **Haplophragma** P. Dop.

Haplophragma adenophyllum (Wall. ex G. Don) P. Dop in Bull. Soc. Bot. France 72:89Ø, 1925; FPP. 195, 1978.

Bignonia adenophylla Wall ex G. Don Gen. Syst. 4:22, 1837.

Bignonia adenophylla Wall. Cat. 65Ø2, 1832.

Heterophragma adenophyllum Seem. ex Benth. & Hook. f. Gen. Pl.

2:1047, 1876.

A medium sized with a dense crown. **Leaves** large unipinnate; leaflets 5-7 broad elliptic. **Flowers** in terminal penicle, yellowish purple. **Fruit** a cylinderic, long capsule, distinctly ribbed and coiled. **Seeds** bilaterally winged.

Planted as avenue tree.

Flowering & Fruiting: September-March.

Siddiqui 31008, Hardoi.

7. **Tecoma** Juss.

Tecoma stans (Linn.) HBK. Nov. Gen. & Sp. 3:144, 1819; Bor & Raizada in Journ. Bomb. Nat. Hist. Soc. 41:683, f. 1. tt. opp. pp. 683 & 684.

Bignonia stans Linn. Sp. Pl. (ed. 2), 871, 1763.

A shrub or small tree. **Leaves** 3-5 pinnate, opposite; leaflets ovate or lanceolate acuminate, sharply serrate, reddish when young. **Flowers** bright yellow; in penicle. **Fruit** a capsule. **Seeds** thin-winged.

Commonly planted in the hedges of gardens for its gracefull and beautifull blossom.

Flowering: July-January; **Fruiting:** February-July.

Siddiqui 31396, Hardoi.

LXXIX. PEDALIACEAE

Key to Genera:

Flowers yellow; fruits with four spines ..... *1. Pedalium*

Flowers pink; fruits smooth ..... *2. Sesamum*

1. **Pedalium** Linn.

Pedalium murex Linn. Syst. 1123, 1759; FBI. 4:386, 1884; Haines in Bot. Bih. & Oris. 2:692, Repr. ed. 1961; FPP. 197, 1978.

A procumbent, foetid smelling herb, surface mucileginous. **Leaves** alternate, oblequely ovate, repand-dentate, crenate, glandular. **Flowers** yellow, solitary axillary, with two glands at the base of pedicels. **Sepals** 5, connate half way, glandular. **Petals** 5, corolla tube spreading obliquely, glandular pubescent externally as well as in the throat. **Stamens** 4; staminode 1, orange coloured. **Style** 1, filiform; stigma 2 lamellate. **Fruit** a pyramido-conical, 4-spines capsule, crustaceous.

Found along river banks, ponds and other marshy places.

Ethnobotanical uses:

An infusion of leaves and stem is used in gonorrhoea and dysuria. Fruits are anti-septic and diuretic. It is used in incontinnence of urine and impotence.

Flowering: August-October; **Fruiting:** November-December.

Local Name: 'Bara-gokharu'

Siddiqui 31174, Tanskhera.

2. Sesamum Linn.

Sesamum orientale Linn. Sp. Pl. 634, 1753; Backer & Bakh. f. Fl. Java 2:544, 1965; HFDD. 372, 1977.

Sesamum indicum Linn. Sp. Pl. 634, 1753; FBI. 4:387, 1884; FUGP. 2:47, Repr. ed. 1960.

Sesamum mulayanun Nair, Bull. Bot. Surv. Ind. 5:521, 1963, syn. nov.

An erect annual herb, foetid smelling, glandular pubescent. Leaves lower ones uaually 3-partite or palmately 3-foliate; upper ones simple lanceolate, serrate. Flowers solitary, axillary , 2-yellow glands at the pedicel base prominent. Sepals 5, basally connate. Petals 5, corolla bilabiate, rosy-pink, spotted with yellow. Stamens 4; anthers gland tipped; staminodes absent or minute. Capsule oblong, obtusely 4-angled and with four longitudnal grooves, beaked. Seeds numerous, compressed.

Commonly cultivated as oil crop, seeds yield an oil lacally called 'Til ka tel' found as an escape also.

Ethnobotanical uses:

Juice of fresh leaves is used in cholera, dysentery, diarrhoea and other bowel disorders. Seeds are a tonic, laxative and diuretic. Its decoction is taken internally in case of piles and constipation. The oil is extracted from seeds are used in dysentery and urinary disorders.

Flowering & Fruiting: July-December.

Local Name: 'Til'

Siddiqui 31159, Sadai behta.

LXXX. MARTYNIACEAE

Martynia Linn.

Martynia annua Linn. Sp. Pl. 618, 1753; Backer, Fl. Males. Ser. (1). 4:221, 1951; Fl. Delhi 263, 1963; HFDD. 373, 1977.

Martynia diandra Gloxin, Obs. 14. t. 1, 1785; FBI. 4:386, 1884; FUGP. 2:48, Repr. ed. 1960.

Erect, widely branched, viscid, densely glandular, long, hairy, annual herb. **Stem** fistular. **Leaves** broadly ovate-orbicular, cordate at base, sub-obtuse at apex, dentate densely glandular hairy, petiole stout, fistular. **Flowers** in axillary, lax racemes; racemes shorter than the petiole, viscid; bracts and bracteoles caducous. **Calyx** viscid, segments unequal. **Corolla** yellowish-purple, gland pubescent; upper lip pink with purple blotch. **Fruits** large, hard, with 2 hooks. **Seeds** black, with serrate dentate ribs and upturned spines.

Common in road sides ditches.

Flowering & Fruiting: August-December.

Siddiqui 31531, Saktapur.

LXXXI. ACANTHACEAE

Key to Genera:

Fertile stamens two:

Anthers cells unequally placed.

Anther cells without a basal spur:

Flowers in panicled or axillary cymes; bracts bifoliate, not mucronate ...1. *Peristrophe*

Flowers in axillary cymes; bracts distinctly mucronate ...2. *Dicliptera*

Both or one of the anther cell with a basal spur:

Inflorescence axillary ...3. *Adhatoda*

Inflorescence terminal.

Flowers in unilateral spikes; bracts with scarious margins ...4. *Rungia*

Flowers in cylindric spikes; bracts not as above...5. *Justicia*

Anthers cells not unequally placed.

Ovary cells 2-ovuled. Cells of the capsule 2-seeded ...6. *Eranthemum*

Ovary cells 6 - 10 ovuled. Capsule

cells 6-10 seeded.

Seeds compressed; capsule subterete ...7. *Phlogacanthus*

Seeds ovoid;capsule compressed...8. *Andrographis*

Fertile stamens four:

Anthers 1-celled; corolla with a minute upper lip ...9. *Blepharis*

Anthers 2-celled; corolla with a developed upper lip:

Corolla segments contorted in bud:

Ovary cells 3-7 ovuled:

Corolla distinctly two-lipped:

Spinose hygroscopic herb; capsule 2 - 8 seeded ..10. *Hygrophila*

Not spinose herb; capsule 8-12 seeded..11. *Hemiadelphus*

Corolla subsequently five lobed:

Capsule fusiform not clavate:

Flowers in capitate spikes ..12. *Hemigraphis*

Flowers in clusters, combined into penicle ..13. *Aechmanthera*

Capsule clavate with a stalked base:

Flowers 1-3 in leaf axils ..14. *Dipteracanthus*

Flowers in axillary pedunclèd cymes ..15. *Ruellia*

Ovary cells 1-2 ovuled:

Anthers cells basally spurred ..16. *Petalidium*

Anthers cells not spurred..17. *Pteracanthus*

Corolla segments imbricate in bud:

Stamens didynamous, 2 anterior stamens exserted, others reduced to staminode ..18. *Barleria*

All stamens perfect and included ..19. *Lepidagathis*

1. **Peristrophe** Nees

Peristrophe bicalyculata (Retz.) Nees in Wall. Pl. As. Rar. 3:113, 1832; FBI. 4:544, 1885; FUGP. 2:79, Repr. ed. 196Ø; HFDD. 388, 1977.

Peristrophe bicalyculata (Retz.) Nees

Dianthera bicalyculata Retz. Sv. Vetensk. Handn. 36:287. t. 9. 1775; Observ. Bot. 1:10, 1779.

A large herb, sometimes attaining the dimensions of an under shrub. **Branches** thinly hairy and 6-angled, the angles more or less scabrid. **Leaves** ovate, acuminate, strongly lineolate; sparsely hairy above and densely so abaxially on the nerves; main lateral nerves 6-7 pairs; petiole slightly winged, hairy. **Flowers** pink; in trichotomous cymes, forming large lax divaricate hairy penicles. **Bracts** 2, unequal. **Calyx** 5-6, greenish, membranous; margins ciliate. **Corolla** pink, hairy outside; upper lip entire, obtuse; lower longer and with a three acute lobes. **Filaments** hairy. **Ovary** placed on a obliquely mouthed cup-shaped disk. **Seeds** 4, papillose.

Common found on waste lands, road sides and in orchards.

Flowering & Fruiting: Rainy and winter season.
Siddiqui 31161, Pihani Road.

2. **Dicliptera** Juss., nom. cons.

Dicliptera verticillata (Forsk.) Christens. in Dansk. Bot. Arkiv. 4(3):11, 1922.

Dianthera verticillata Forsk. Fl. Aegypt. -Arb. 9, 1775.

Dicliptera micranthes Nees in Wall. Pl. As. Rar. 3:112, 1832; FBI. 4:553, 1885; FUGP. 2:81, Repr. ed. 1960.

A prostrate or decumbent dark green herb; branches angular. **Leaves** ovate, acuminate, cuneate at the base, entire. **Flowers** in axillary clusters; each cluster with a single perfect flower;

bracts densely white ciliate. Corolla 2-lipped, pink. Capsule ovate. Seeds echinulate.

Commonly found near some water coarse.

Flowering & Fruiting: Late rainy season to whole winter.

Siddiqui 31498, Sadai behta.

3. **Adhatoda** Mill.

Adhatoda vasica (Linn.) Nees in Wall. Pl. As. Rar. 3:103, 1832; HFDD. 376, 1977.

Justicia adhatoda Linn. Sp. Pl. 15, 1753; FBI. 4:540, 1885; FUGP. 2:76, Repr. ed. 1960.

A much branched robust shrub. Stem densely appressed-pubescent on young parts. Leaves oblong-lanceolate; long petiole, acute, shining above, gland dotted (more evidently on dorsal surface). Flowers in short, dense, axillary spikes, arranged towards the ends of branches; peduncles dorsoventrally grooved. Bracts sessile, puberullous on both the surfaces, elliptic, subacute, 6-7 nerved, gland dotted dorsally; bracteoles 2, more densely puberullous than the bracts, ovate, acute. Calyx 5 partite; segments equal, lanceolate, acute, entire, single nerved. Petals 5, 2-lipped, upper lip hairy outside, notched; lower middle lobe with light purple veins. Stamens 2, filaments compressed.

Abundant on waste places, road sides and in uncared orchards.

Ethnobotanical uses:

The leaf juice is given diarrhoea and dysentery. Fresh juice of the leaves mixed with ginger and honey is used in chest diseases.

Powder of the leaves is also given in chronic bronchitis and asthma. Poultice of the leaves is applied over fresh wounds, rheumatic joints and inflammatory swellings. A warm decoction of leaves is used for scabies and other skin diseases. The root is expectorent, anti-spasmodic, anti-septic and anthelmintic. Expectorent is used in the disease of respiratory system, diphtheria and gonorrhoea.

Flowering & Fruiting: November-May.

Local Name: 'Roosa'

Siddiqui 3195, Pihani Road.

4. **Rungia** Nees

Rungia pectinata (Linn.) Nees in DC. Prodr. 11:469, 1847; Santapau Journ. Bomb. Nat. Hist. Soc. 51:365, 1953; HFDD. 393, 1977.

Justicia pectinata Linn. Amoen. Acad. 4:299, 1759.

Rungia parviflora (Retz.) Nees var. *pectinata* Cl. in FBI. 4:550, 1885; FUGP. 2:80, Repr. ed. 1960.

Decumbent or procumbent-ascending or prostrate, often much branched, some times caespitose herb. **Stem** often rooting from the lower nodes, glabrous or hairy. **Leaves** oblanceolate-spathulate to oblong or lanceolate-elliptic, acute at base, obtuse or sub acute at apex, glabrous, ciliate, main lateral nerves 4-5 paires. **Flowering spikes** axillary (paired or single) or terminal; secund. **Bracts** dimorphic; sterile narrower and fertile broader, apex usually notched. **Bracteoles** always with a notched apex. **Corolla**

bluish-white. **Lower anther** lobed with a white appendage. **Ovary** on a cupular disc.

Abundant, found on a variety of soil but usually in moist and shady places.

Flowering & Fruiting: Rainy and winter season.

Siddiqui 31474, Raro.

5. **Justicia** Linn.

Justicia diffusa Willd. Sp. Pl. 1:87, 1797; FBI. 4:538, 1885; FUGP. 2:78, Repr. ed. 1960; FL. Delhi 271, 1963.

Rostellaria diffusa Nees in Wall. Pl. As. Rar. 3:100, 1832.

A diffused, much branched, shallow-rooted herb. **Stem** 4-angled, strigose with reflexed hairs. **Leaves** elliptic-lanceolate, glabrous or with scattered hairs on nerves beneath. **Flowers** pink or pale purple, in axillary or terminal spikes. **Stamens** 4, glabrous; lower anther lobes basally spurred. **Capsule** oblong, glabrous.

Often found as a weed in cultivated fields.

Flowering: September-October; **Fruiting:** October-November.

Siddiqui 31078, Pihani Road.

6. **Eranthemum** Linn. emend. Radlk.

Eranthemum nervosum (Vahl) R. Br. ex Roen. & Schult. Syst. Veg. 1:174, 1817; Fl. Delhi 275, 1963; HFDD. 382, 1977.

Justicia nervosa Vahl, Enum. Pl. 1:164, 1804; Bot. Mag. t. 1358, 1811.

An erect, suffruticose, perennial herb or under shrub. **Stem** 4-gonous. **Leaves** elliptic-ovate or ovate-oblong, leathery, lineolate with cystolith. **Flowers** in axillary and terminal spiciform racemes; bracts prominently nervose. **Calyx** 5-lobed, divided half way down, segments unequal. **Corolla** blue rarely white. **Style** hairy. **Capsule** clavate, glabrous.

Commonly found along 'nalas' under shady trees. Also grown in gardens.

Flowering: February-April; **Fruiting:** April-May.

Siddiqui 31242, Kundouli.

7. **Phlogacanthus** Nees

Phlogacanthus thyrsiflorus (Roxb.) Nees in Wall. Pl. As. Rar. 3:99, 1832; FBI. 4:512, 1884; FUGP. 2:68, Repr. ed. 1960; HFDD. 389, 1977.

Justicia thyrsiflora Roxb. Fl. Ind. Carey & Wall. 1:114, 1820.

An erect perennial under shrub. **Stem** 4-angled, thickened, often purple tinged nodes. **Leaves** drooping petiolate, oblanceolate, oblong to elliptic, alternate towards the base, acuminate, glabrous, glossy-green above. **Flowers** pedicelled, crowded in 4-5 flowered whorls forming terminal thyrsoid 15-25 cm long spikes. **Sepals** linear-setaceous villous. **Corolla** brick-red or orange-coloured, villous, tube laterally compressed. **Anthers** dark brown. **Capsule** linear-clavate, glabrous. **Seeds** densely hairy.

Commonly found in moist and shady situations.

Flowering: February-April; **Fruiting:** May-June.

Siddiqui 31363, Pokher.

8. **Andrographis** Wall.

Andrographis paniculata (Burm. f.) Nees in Wall. Pl. As. Rar. 3:116, 1832; FBI. 4:501, 1885; FUGP. 2:66, Repr. ed. 1960; Fl. Delhi 268, 1963.

Justicia paniculata Burm. f. Fl. Ind. 9, 1768.

An erect, glabrous annual herb or under shrub. **Stem** 4-angled. **Leaves** ovate-lanceolate, minutely punctate. **Flowers** in axillary and terminal racemes combined into panicles. **Corolla** bilabiate, 2/3 arrangement, upper one creamy-yellow, lower one whitish with purple streaks. **Stamens** 2; filament dilated at base; anthers deep violet, basally bearded. **Capsule** compressed, glandular-pubescent when young at length nearly glabrous.

Often found in moist and shady situations.

Flowering: November-December; **Fruiting:** January-February.

Siddiqui 31570, Baturi purva.

9. **Blepharis** Juss.

Blepharis molluginifolia Pers. Syn. 2:180, 1807; FBI. 4:479, 1884; FUGP. 2:54, Repr. ed. 1960; Fl. Delhi 267, 1963.

A prostrate hispid herb. **Stem** often rooting at nodes. **Leaves** sessile, whorled of 4 fleshy and unequal, elliptic-ovate. **Flowers** mostly solitary axillary, enveloped by 4-5 pairs of bracteoles, blue. **Corolla** blue, upper lip minute, lower one 3-lobed, obovate. **Stamens** 4, didynamous. **Capsule** ellipsoid, 2-seeded, included.

Commonly found in open grassy lands.

Flowering: October-November; **Fruiting:** December-February.

Siddiqui 31507, Kahoura.

Hygrophila auriculata (Schum.) Heine

10. **Hygrophila** R. Br. emend. Heine

Hygrophila auriculata (Schum.) Heine, Kew Bull. 16(2):172, 1962; Raizada Ind. For. 92(5):312, 1966; HFDD. 385, 1977.

Barleria auriculata Schum. in Schum. & Thonn. Besker. Guin. Pl. 285, 1827.

Barleria longifolia Linn. Amoen. Acad. 4:320, 1759.

Asteracantha longifolia (Linn.) Nees in Wall. Pl. As. Rar. 3:90, 1832; FUGP. 2:184, Repr. ed. 1973.

Hygrophila spinosa T. Anders. in Thwaites, Enum. Pl. Zeyl. 225. 1860; Journ. Linn. Soc. Bot. 7:22, 1863; FBI. 4:408, 1884.

An erect, stout, hygrophilous herb. **Stem** subquadrangular, thickened at nodes, pubescent. **Leaves** linear-lanceolate, in whorls of 4-6, unequal, straight spines. **Flowers** in axillary whorls. **Sepals** 5, connate, silky pubescent. **Petals** 5, connate, bilabiate, bluish-purple, palate with distinct-streaks. **Fruit** a linear oblong capsule, glabrous, 2-8 seeded. **Seeds** hygroscopically mucillaginous hairy.

Commonly found along marshy situations.

Ethnobotanical uses:

A decoction of the leaves is administered in rheumatism, syphilis and gonorrhoea. The roots is an excellent diuretic, demolcent and stimulate; it is used in dropsy, gonorrhoea, hepatic obstruction, rheumatism and in urinary disorders including stone and gravel in kidneys; its decoction is given in sodorific. The seeds are used in gonorrhoea and urinary diseases.

Flowering: September-December; **Fruiting:** November-February.

Local Name: 'Tal-makhana'

Siddiqui 31090, Pihani Road.

11. **Hemiadelphus** Nees

Hemiadelphus polyspermus Nees in Wall. Pl. As. Rar. 3:80, 1832; Bremak. in Dansk. Bot. Arkiv. 20:66, 1961.

Justicia polysperma Roxb. Hort. Beng. 3, 1814.

Hygrophila polysperma (Roxb.) T. Anders. in Journ. Linn. Soc. 9:456, 1867; FBI. 4:406, 1884; FUGP. 2:56, Repr. ed. 1960.

A procumbent herb. **Stem** much branched, obtusely 4-angled, profusely rooting at nodes, pubescent in younger portions. **Leaves** subsessile, linear-lanceolate, appressedly puberulous. **Flowers** in dense cylindric, 3-7 cm long spikes. **Calyx** villous pubescent. **Corolla** bilabiate, pale-blue. **Stamens** 4, 2-posterior ones reduced to staminodes. **Fruit** linear-oblong, capsule.

Common in moist and shady places.

Flowering: October-January; **Fruiting:** November-March.

Siddiqui 31081, Lakhimpur Road.

12. **hemigraphis** Nees, ement. T. Anders.

Hemigraphis hirta T. Anders. in Journ. Linn. Soc. 9:462, 1867; FBI. 4:422, 1884; FUGP. 2:60, Repr. ed. 1960.

Ruellia hirta Vahl, Roxb. Fl. Ind. 3:46.

A softly and densely white pubescent herb. **Stem** long, creeping, 4-angled. **Leaves** ovate or oblong, crenate, the base as well as

apex obtuse; lateral nerves obscure on upper surface; hairy on both surfaces; petiole short. **Heads** 2-6 flowered; bracts elliptic, pubescent, margins slightly dentate; bracteoles none. **Calyx** green, segments five, unequal, united nearly to the middle from the base, hairy. **Corolla** pale-blue, soon fadding to brown, shortly hairy outside. The lower lip has a dense transverse pubescent at the junction of limb and the tube. **Stamens** 4, didynamous; the longer filaments hairy. **Stigmas** subequal, one branch well developed the others just a protuberance. **Seeds** 6-7.

Common in agricultural fields.

Flowering: January-March; **Fruiting:** February-April.

Siddiqui 31247, Reddupur.

13. **Aechmanthera** Nees

Aechmanthera gossypina (Nees) Nees in Wall. Pl. As. Rar. 3:87, 1832; HFDD. 377, 1977.

Ruellia gossypina Nees in Wall. Pl. As. Rar. 1:37, t. 42, 1830.

Aechmanthera tomentosa Nees, Pl. As. Rar. 3:87, 1832; FBI. 4:428, 1884; FUGP. 2:59, Repr. ed. 1960.

Erect under shrub or shrub. **Stem** tomentose woolly. **Leaves** petioled, elliptic or lanceolate, acute with rounded base, crenate, densely white tomentose. **Flowers** in 3-8 flowered clusters or trichotomous spreading terminal panicles. **Bracts** and bracteoles linear, glandular hairy. **Calyx** glandular-hairy. **Corolla** purple-blue, bilabiate, palate with two hairy lines. **Filaments** hairy at base; anthers apiculate. **Capsule** usually

8-seeded. **Seeds** discoid, hairy retinacula hooked.

Flowering: October-January; **Fruiting:** December-April.

Siddiqui 3151Ø, Atwa.

14. **Dipteracanthus** Nees emend. Bremek.

Dipteracanthus prostratus (Poir.) Nees in Wall. Pl. As. Rar. 3:81, 1832; Bremek. Herb. Kon. Ned. Ak. Wet. A'dam. Sect. 2. 45:1. 16, 1948; HFDD. 381, 1977.

Reullia prostrata Poir in Lamk. Encycl. 4:349, 18Ø4; FBI. 4:411 [incl. var. *dejecta* (Nees) Clarke]; FUGP. 2:57, Repr. ed. 196Ø.

Dipteracanthus dejectus Nees in Wall. Pl. As. Rar. 3:82, 1832.

Prostrate, branched herb, with a woody base; nodes swollen; younger parts distinctly hairy. **Leaves** ovate-lanceolate, rounded or subcordate at the base obtuse or acute at the apex; longer than the calyx. **Corolla** pale-purple; hairy outside. **Ovary** densely hairy near the top. **Capsule** densely pubescent.

Not common, found among the hedges on dry and sandy soil.

Flowering & Fruiting: February-May.

Siddiqui 31345, Chhatouri.

15. **Ruellia** Linn. emend. Bremek.

Ruellia tuberosa Linn. Sp. Pl. 635, 1753; Bremek. in Verh. K. Nederl. Akad. Wet. A'dam Sect. 2. 45:1. 11, 1948; HFDD. 392, 1977.

An erect herb, with elongated tuberous roots. **Stem** 4-angled, swollen at nodes, young portions pubescent. **Leaves** opposite,

oblong, obovate, sparingly pubescent. **Flowers** in few-flowered axillary peduncled-cymes, bracteole, pale-blue. **Sepals** 5, shortly connate below, reflexed at length. **Corolla** infundibuliform, light violet-blue, throat darker. **Stamens** 4, didynamous. **Fruits** linear capsule, on stalked-base, dark brown to black on ripening, elastically dehiscent producing a sound when moistend retinacula well developed. **Seeds** covered with mucilagenous hairs, dark-brown.

Occassionally found on the edges of forest and orchards in a moist situation.

Flowering: July-October; **Fruiting:** August-Early November.

Local Name: 'Chichitta'

Siddiqui 31484, Majhola.

16. **Petalidium** Nees

Petalidium barlerioides (Roth.) Nees in Wall. Pl. As. Rar. 3:82, 1832; FBI. 4:416, 1884; FUGP. 2:61, Repr. ed. 1960; HFDD. 389, 1977.

Erect or clambering, suffruticose, perennial undershrub. **Stems** many from the woody base, sparingly branched, short hairy towards the apex. **Leaves** ovate-lanceolate, crenate-serrate, cuneate or decurrent on the petiole. **Flowers** axillary, in pairs, forming leafy racemes. **Bracteoles** leaf-like, ovate-lanceolate. **Calyx** segments linear-lanceolate, glandular hairy. **Corolla** white, tubular-ventricose; ventricose portion purplish veined and hairy, lobes contorted in bud, crenulate, later. **Anthers** spurred. **Ovary** 2-celled, hairy. **Capsule** compressed, dilated upward. **Seeds** 2,

covered with mucilagenous hairs.

Commonly found on the forest.

Flowering: March-May; **Fruiting:** May-June.

Siddiqui 3138Ø, Baturi purva.

17. Pteracanthus Bremek.

Pteracanthus angustifrons (Clarke) Bremek. Verh. Kon. Ned. Ak. Wet. A'dam. Sect. 2, 41:1, 2ØØ, 1944; HFDD. 39Ø, 1977.

Erect or clambering, often much branched, perennial herb. **Stem** 4-gonous, glabrous. **Leaves** opposite, in unequal pairs, ovate-elliptic to lanceolate, crenate-serrate, glabrous or thinly hairy, narrowed into a winged petiole. **Flowers** in capitate spikes forming panicles, purple. **Bracts** and bracteoles foliaceous. **Calyx** gland hairy; segments unequal. **Corolla** blue or violet, lobes orbicular, retuse, glabrous or thinly hairy. **Style** glandular-hairy. **Capsule** gland hairy at the top.

Commonly found in damp and shady localities.

Flowering & Fruiting: September-December.

Siddiqui 31499, Sadai behta.

18. Barleria Linn.

Barleria prionitis Linn. Sp. Pl. 636, 1753; FBI. 4:482, 1884; FUGP. 2:64, Repr. ed. 196Ø; HFDD. 379, 1977.

A bushy, prickly undershrub, branching from base. **Stem** obscurely 4-angled, glabrous, grey-white. **Spines** 3-4 or more in the axil of leaves, white. **Leaves** petioled, ovate to elliptic, tappering at

ends, tipped with a spinuate at apex. **Flowers** orange-yellow in terminal spikes, spinescent. Outer 2-sepals, oblong, lanceolate, spine-tipped; 2 inner ones linear-lanceolate, mucronate. **Corolla** orange-yellow or creamy, 2-lipped. **Capsule** black, pointed, generally 2-seeded.

Commonly found in waste places.

Flowering: October-March; **Fruiting:** March-June.

Siddiqui 31556, Hardoi.

19. **Lepidagathis** Willd.

Lepidagathis cuspidata Nees in Wall. Pl. As. Rar. 3:97, 1832; FBI. 4:519, 1885; Cook, Fl. Bomb. 2:296; FUGP. 2:73, Repr. ed. 1960; HFDD. 386, 1977.

Erect, suffruticose undershrub. **Leaves** in equal pairs, ovate, obovate to spathulate, mucronate, smaller on branchlets. **Flowers** in spikes, white. **Calyx** glandular hairy; outer broader segments spine-tipped. **Corolla** predominantly white, streaked with purple. **Capsule** 4-seeded. **Seeds** shortly hairy, especially on margins.

Not common, found among the stones at the bank of the river.

Flowering & Fruiting: February-May.

Siddiqui 31353, Pokher.

The following plants are cultivated in gardens and parks.

1. *Gendarussa vulgaris* Nees in Wall. Pl. As. Rar. 3:104, 1832; Bremek. Dansk. Bot. Arkiv. 20:81, 1961; HFDD. 383, 1977.

A much branched undershrub. **Leaves** lanceolate, subcoriaceous with

purple-violet nerves. **Flowers** in terminal and axillary spikes. **Calyx** 5-partite. **Corolla** creamy-white, with violet streaks on palate, honey-nectaries at the base of corolla tube. **Stamens** 2; anther cells 2, unequally placed, lower on basally spurred.

Cultivated as a hedge plant.

Flowering: November-January; **Fruiting:** Not seen.

Siddiqui 31937, S.P. Lodge.

2. *Thunbergia grandiflora* Roxb. in Bot. Reg. 6, t. 496, 1820; Bor & Raiz. Beaut. Ind. Cl. & Sh. 108, Pl. 40.

A large climbing shrub. **Leaves** broadly ovate, scarcely palmatilobed. **Flowers** in terminal racemes, violet-blue.

Grown as pargolas in gardens.

Flowering: September-February.

Siddiqui 31949, Hardoi.

LXXXII. VERBENACEAE

Key to Genera:

Unarmed trees or large shrubs; often armed with axillary spines:

Flowers actinomorphic, usually white; stamens subequal unarmed tree ..... 1. *Tectona*

Flowers zygomorphic, mostly yellow; stamens didynamous; usually tree or large shrub often armed with axillary spines ..... 2. *Gmelina*

Erect or scandant shrubs:

Leaves simple.

Flowers in ovoid or cylindric spikes; calyx tubes bilobed; stamens not exserted; strong smelling erect shrub ..... 3. *Lantana*

Flowers in peduncled cymes; calyx 5-partite; stamens exserted ..... 4. *Clerodendrum*

Leaves digitately compound; erect shrubs ..... 5. *Vitex*

Erect or prostrate herbs:

Calyx tube 2-partite; a creeping herb with unicellular 2-armed appressed hairs ..... 6. *Phyla*

Calyx tube 5-partite; erect or pro-
cumbent herb .....7. *Verbena*

1. Tectona Linn. f., nom. cons.

Tectona grandis Linn. f. Suppl. 151, 1781; FBI. 4:570, 1885; FUGP. 2:87, Repr. ed. 1960; FPP. 210, 1978.

A large deciduous tree with a dome-shaped or broadly conical crown. **Bark** dark-grey, young branches 4-angled and grey pubescent. **Leaves** broadly ellipitic or obovate or sometimes nearly orbicular quite scabrid adaxially and stellate tomentose abaxially. Flowers in large terminal, pyramidal penicles. **Fruits** enclosed in persistent, acrescent and inflatted calyx. **Seeds** 1-3, sometimes 4.

Planted within the area.

Ethnobotanical uses:

Plaster of the powdered wood is used in bilious headache and for the dispertion of inflammatory swelling. The bark is used in as an astringent, and oil of the nuts is used for making the hair grow and removing itchiness of the skin. Flowers and seeds are diuretic. The powder of fruit is rubbed on the pubis produces a marked diuresis in partial suppresion of urine.

Flowering: July-August; **Fruiting:** October-November.

Local Name; 'Sagon'

Siddiqui 31030, Hardoi.

2. Gmelina Linn.

Gmelina arborea Roxb. Hort. Beng. 46, 1814; FBI. 4:581, 1885;

FUGP. 2:88, Repr. ed. 1960; Ind. Tr. 509, Repr. ed. 1971.

A large deciduous tree, unarmed with straight trunk. **Bark** greyish-yellow, excorticating in irregular flaks. **Leaves** broad-ovate, acuminate, glabrous above, fulvous-tomentose beneath, deeply cordate at base, long petiole, straight, densely pubescent. **Flowers** in terminal penicles, bracteate yellow, often tinged reddish-brown. **Calyx** tubes short, cupular, 5-toothed with 2-5 glands on interior side. **Corolla** 2-labiate, 2/3 arrangements, lateral lobes with crenulate margins. **Stamens** 4 didynamous, the longer filament glanduliferous. **Fruit** an ellipsoid-obovoid drupe, orange-yellow on ripening. **Seeds** 1-3, lenticular.

Not uncommon, cultivated within the area.

Ethnobotanical uses:

Decoction of the leaves is used in diabetes. Root is considered as bitter, tonic, stomachic, laxative and usefull in fever, indigestion, anasarca etc.

Flowering: december-February; **Fruiting:** March-April.

Local Name: 'Gambra'

Siddiqui 31557, Baturi purva.

3. **Lantana** Linn.

Lantana camara Linn. Sp. Pl. 627, 1753; Schau. in DC. Prodr. 11:606, 1847; Meeuse, Blumea 5:69, 1942; HFDD. 399, 1977.

Lantana aculeata Linn. SP. Pl. 627, 1753.

Lantana camara Linn. var. *aculeata* (Linn.) Moldenke, Torreya 34:9, 1934.

An erect or straggling spiny shrub, with an unpleasant odour. Stem 4-angled with recurved spines. Leaves ovate, crenate; petiolate, hispid above. Flowers in pedunculate corymbs; elongating with the anthesis. Corolla tube 4-lobed, lobes unequal; pink or yellow. Fruit a drupe, deep purple.

Abundant, can be located in almost any type of mesophitic or xerophitic localities.

Ethnobotanical uses:

Paste of the leaves is applied on ringworm and in itching of the skin.

Flowering & Fruiting: Nearly round the year.

Local Name: 'Lantana'

Siddiqui 31035, Hardoi.

4. Clerodendrum Linn.

Key to species:

Leaves opposite.

Hairy herbs; calyx enlarged, pink in fruit .....1. *C. viscosum*

Glabrous shrubs; calyx not enlarged in fruit; leaves extremely bitter; usually grown for hedging .....2. *C. inerme*

Leaves ternate;entire; drupe bluish-green seated on enlarged red calyx .....3. *C. indicum*

1. Clerodendrum viscosum Vent. Jard. Malm. t. 25, 1803; Santapau,

Bull. Bot. Serv. Ind. 3:14, 1961; HFDD. 397, 1977; FPP. 208, 1978.

Clerodendrum infortunatum Linn. Sp. Pl. 637, 1753.

Erect, often much branched, hairy perennial herb; older parts glabrous or glagrescent, younger parts more hairy. **Stem** obtusely 4-angled, often purple tinged. **Leaves** ovate with subcordate base, crenate dentate, often gland hairy. **Flowers** in cymes combined into terminal penicles, rusty pubescent. **Calyx** with rusty pubescence, more so near the base, hairy inside too, becomes bright red in fruit. **Corolla** white, near the base rusty hairy externally. **Anthers** red.

Abundant, found along road sides, railway tracks and fallow lands.

Ethnobotanical uses:

Juice of the leaves is excellent laxative and anthelmintic. Paste of the leaves and fruit is applied over the bowls and wounds.

Flowering & Fruiting: March-July.

Local Name: 'Tikkhar'

Siddiqui 31055, Bilgram Road.

2. **Clerodendrum inerme** (Linn.) Gaertn. Sem. 1:271. t. 75. 1788; FBI. 4:589, 1885; HFDD. 397, 1977.

Volkameria inermis Linn. Sp. Pl. 889, 1753.

A straggling shrub. **Leaves** obovate to elliptic-oblong, glabrous, subfleshy. **Flowers** pure white with purple red filament of stamens, in axillary 3-flowered cymes. **Corolla** tube long,

slender.

Common, a favourite plant of gardeners for hedging as it is said to keep the snakes away.

Ethnobotanical uses:

Juice of the leaves and roots is used as alterative in scrofulous and veneral affections. The leaves poultice to resolve buboes. Warm paste of the leaves is applied over recent wounds.

Flowering 7 Fruiting: June-Decemebr.

Local Name: 'Qunane'

Siddiqui 31099, Hardoi.

3. **Clerodendrum indicum** (Linn.) O. Kuntze, Rev. Gen. Pl. 586, 1891; HFDD. 397, 1977; FPP. 207, 1978.

Siphonanthus indica Linn. Sp. Pl. 109, 1753.

Clerodendron siphonanthus R. Br. in W. Ait. Hort. Kew ed. 2. 4:65, 1812; FBI. 4:595, 1885; FUGP. 2:93, Repr. ed. 1960.

This species can be readily distinguish from other species of *Clerodendrum* by erect, tall habit; sulcate stem; ternate, linear lanceolate, acute, entire leaves and the calyx which turns bright red in fruit.

Common, found in damp places.

Flowering & Fruiting: Summer and rainy season.

Siddiqui 31065, Lakhimpur Road.

5. **Vitex** Linn.

Vitex negundo Linn. Sp. Pl. 638, 1753; FBI. 4:583, 1883; FUGP.

2:90, Repr. ed. 1960; Ind. Tr. 503, 1971; FPP. 210, 1978.

A large spreading shrub, bark dark grey; young branches 4-angled, grey tomentose. **Leaves** digitately 3-foliate, white tomentose beneath, crenate-serrate. **Flowers** light-blue; in terminal penicles. **Fruit** a globose drupe, black on ripening.

Common near orchard, on borders of the fields and waste lands.

Flowering & Fruiting: Round about the year.

Siddiqui 31321, Asgaon.

6. **Phyla** Lour.

Phyla nodiflora (Linn.) Greene in Pittonia 4:46, 1899; HFDD. 399, 1977; FPP. 209, 1978.

Verbena nodiflora Linn. Sp. Pl. 20, 1753.

Lippia nodiflora (Linn.) A. Rich. in Michx. Fl. Bor. Amer. 2:15, 1803; FBI. 4:563, 1885; FUGP. 2:84, Repr. ed. 1960.

An extensively branched, prostrate herb, rooting at the nodes. **Leaves** obovate, cuneate, coarsely toothed in the upper part. **Flowers** in axillary, compact hard globose-oblong heads; elongating with the anthesis. **Sepals** 2-lobed. **Corolla** 2-lipped, white turning to rose-purple. **Fruit** separating into two pyrenes.

Common on road sides grass-lands and dry river beds.

Ethnobotanical uses:

Plant is used with cumin in case of gonorrhoea and as diuretic; its paste applied to promote suppuration. A poultice composed of fresh plant is a good maturant for boils.

Flowering & Fruiting: Major part of the year.

Local Name: 'Machechi'

Siddiqui 31Ø15, Bilgram Road.

7. Verbena Linn.

Verbena officinalis Linn. Sp. Pl. 2Ø, 1753; FBI. 4:565, 1885; FUGP. 2:85, Repr. ed. 196Ø; HFDD. 4Ø1, 1977; FPP. 21Ø, 1978.

An erect herb, more or less gland pubescent. **Branches** 4-angled; puberulous. **Leaves** variously lobed, narrowed to the base, 3-lobed. **Flowers** in terminal spikes, elongating with the anthesis, bracteate; bracts ovate, acute, hairy. **Calyx** twice as long as the corolla, minutely toothed and glandular hairy, bluish pink or blue; limb spreading, throat hairy. **Stamens** 4, filaments short. **Stigma** oblique, obscurely 2-lobed.

Common on road sides and waste-lands.

Ethnobotanical uses:

Leaf juice is given in case of diarrhoea. Plant is also used in paralysis, amenorrhoea. Plaster of the leaves promotes healing of wounds. An ointment is recommended for swellings of wombs and a vinegar in skin diseases.

Flowering & Fruiting: Rainy and winter season.

Local Name: 'Verbina'

Siddiqui 31485, Majhola.

Following plants are often cultivated in gardens and parks.

1. Verbena bipinnatifida Schau. in DC. prodr. 11:553, 1847.

A much branched prostrate herb with ascending branches. Leaves dissected into linear-oblong segments. Flowers in terminal, pedunculate oblong heads, much enlarging in fruiting stage. Corolla tube lilac-purple.

Flowering & Fruiting: Almost round the year.

2. Duranta repens Linn. Sp. Pl. 637, 1753.

An erect much branched shrub. Leaves ovate-elliptic, crenate-serrate. Flowers in terminal penicles, pale-blue or pure white.

Flowering & Fruiting: Almost round the year.

3. Callicarpa macrophylla Vahl, Symb. Bot. 3:13, t. 53, 1794; FBI. 4:568, 1885; FUGP. 2:86, Repr. ed. 1960; HFDD. 396, 1977; FPP. 206, 1978.

A large much spreading shrub. Leaves oblong-lanceolate, crenate-serrate, densely covered with stellate hairs when young. Flowers in axillary peduncled cymes. Corolla violet with yellow glandular dots.

Flowering & Fruiting: April-January.

4. [illegible] G. Don. in Edinb. N. Phil. Journ. 11:349, 1824; Bailey, Stand, Cycl. Hort. 1:800, 1950; Backer & Bakh f. Fl. Java 2:611, 1965 & 3:657, 1968; Suppl. FUGP. 213, 1976.

A large twinning shrub. Leaves ovate-oblong, often with undulate margins. Flowers in axillary and terminal compact cymes, deep red or orange red.

Flowering: January-April; Fruiting: No fruit setting.

LXXXIII. LAMIACEAE (LABIATAE nom. alt.)

Key to Genera:

Flowers predominantly white.

Calyx 2-liped.

Stamens 4, declinate; two upper filaments tooth at the base .....1. *Ocimum*

Stamens 2, (there may be 2-staminodes) connective articulated with the filaments .....2. *Salvia*

Calyx not 2-liped.

Upper lip of corolla 3-lobed, not woolly; flowers in axillary and terminal, compact, elongated, interrupted, spikes; a large herb.....3. *Pogostemon*

Lower lip of corolla three-lobed; upper lip densely woolly; flowers in axillary, distant, glomerate whorls; a dwarf herb .....4. *leucas*

Flowers otherwise.

Flowers blue, violet.

Erect, tall herb; calyx 10-nerved.....5. *Hyptis*

Ascending or decumbent herb; calyx 15 nerved .....6. *Nepeta*

Flowers pink, pinkish or orange.

Pink or pinkish red, upper lip not woolly.

Lower pair of the stamens longer; anthers of upper pair 2-celled, of lower pair, one-celled, cells tranverse parallel; stout herb .....7. *Anisomeles*

Upper pair of stamens longer; all anthers 2-celled; slender herb .....6. *Nepeta*

Flowers deep orange in axillary glomerate whorls; calyx teeth spined tipped; upper corolla lip longer, densely woolly .....8. *Leonotis*

1. Ocimum Linn.

Ocimum canum Sims, in Bot. Mag. 51:t. 2452, 1823; FBI. 4:607, 1885; Mukerjee, Lab. Ind. Emp. 17, 1940; FUGP. 2:99, Repr. ed. 1960; HFDD. 416, 1977; FPP. 215, 1978.

Ocimum americanum Linn. Sp. Pl. 833, 1753.

An erect branched, glandular-pubescent annual herb. **Leaves** ovate, elliptic-oblong to elliptic-lanceolate, punctate, entire to shallowly toothed, cuneate. **Flowers** white (some times tinged with purple); inflorescence lax. **Calyx** 5-lobed; upper lobe the largest and thicker, nearly rounded. **Corolla** bilabiate. **Stamens** 4, declinate, exerted. **Nutlets** ellipsoid, black when ripe.

Abundant in cultivated lands, also on road sides and waste places.

Flowering: July-November; fruiting: August-December.

Siddiqui 31138, Sadai behta.

2. **Salvia** Linn.

Salvia plebia R. Br. Prodr. 501, 1810; FBI. 4:655, 1885; Mukerjee Rec. Bot Surv. Ind. 14:111, 1940; FUGP. 2:118, Repr. ed. 1960; HFDD. 420, 1977.

An erect roughly pubescent herb. **Stem** stout, fastgiately branched, obtusely 4-angled; lower nodes tinged with purple, hoary pubescent. **Leaves** before flowering there are only redical leaves, forming a rossette; oblong, lanceolate, obtuse or subacute, crenate, patiolate; patiole base dialated; base usually acute and often decurrant, both the surfaces with small hairs. Floral leaves stalked, ovate, sub acute, more hairy than the lower leaves and with few glandular hairs near the base. **Flowers** in panicled, glandular pubescent, spicate racemes. **Calyx** pedicelled, pubescent with collecters as well as simple hairs, 2-liped; upper lip entire, shorter than the lower, reflexed. **Corolla** white or lilac, hairy outside; tube with a ring of hairs inside. **Stamens** 2, connective, elongated and articulated with the short filament; anther cells separate, upper fertile, lower empty, staminodes 2. **Nutlets** minute, brown.

Abundant. On waste land and old building walls.

Ethnobotanical uses:

Fruits are used in gonorrhoea and also to promote sexual power.

Flowering & Fruiting: January-May.

Local Name: 'Vilayeti tulsi'

Siddiqui 31362, Pokher.

3. **Pogostemon** Desf.

Pogostemon benghalense (Burm. f.) O. Kuntze, Rev. Gen. Pl. 2:529, 1891; Merr. Philipp. Journ. Sci. 19:379, 1921; HFDD. 418, 1977.

Origanum benghalense Burm. f., Fl. Ind. 128, t. 38, f. 3, 1768.

Pogostemon plectranthoides Desf. Ann. Mus. Paris 2:155, 1803; FBI. 4:632, 1885; FUGP. 2:105, Repr. ed. 1960.

An under shrub, more than 1 m high, aromatic young parts grey tomentose; branches terete or subquadrangular; older parts often purple tinged. **Leaves** ovate, acute, doubly serrate, base rounded, cuneate or very much unequal. **Flowers** dense, villous, bracteate whorls, crowded in numerous, cylindric spikes, the whorl forming an erect terminal panicles. **Bracts** foliaceous, sessile, ovate, acute, softly hairy outside. No gland could detected; bracteoles mostly oblique, acute, villous outside. **Calyx** not glandular pubescent, teeth tringular, lanceolate, ciliate, 5-nerved. **Corolla** white, tube slender, curved, 4-lobed; upper lip consisting of 3-lobes; middle one narrow and longer, upper lip gland pubescent outside; lower lip with few hairs. **Filaments** bearded near the upper part with pink or dark pink moniliform hairs, the base being pubescent with white hairs, middle region glabrous.

Common, in road side ditches.

Flowering & Fruiting: Late rainy-winter season.

Siddiqui 31329, Hardoi.

4. **Leucas** R. Br.

Leucas aspera (Willd.) Spreng. Syst. 2:743, 1825; FBI. 4:690, 1885; Mukerjee, Lab. Ind. Emp. 166, 1940; FUGP. 2:113, Repr. ed. 1960; Fl. Delhi 290, 1963.

Phlomis aspera Willd. in Link. Enum. Pl. Hort. Berol. 2:621, 1822.

An erect hairy much branched herb; hair usually spreading. **Leaves** sub-sessile shortly petioled, linear-lanceolate, obtuse, entire, hairy, more so abaxilly. **Flowers** in axillary and terminal glomerate whorls. **Calyx** tube obconic, **glabrous** in lower half and hairy in upper half; mouth oblique, wide toothed, teeth subulate. **Corolla** 2-liped; upper lip much smaller white woolly; lower lip spreading; middle lobe glabrous and large; lateral lobe acute and smaller. **Stamens** 4, didynamous; filaments dilated; anthers red. **Nutlets** brown, with subtruncate apex, smooth.

The arrangement of hairs on the upper lip is quite beautifull, whole top of upper lip is covered with fine cottony, irregularly arranged hairs but on the margins there are comparatively thicker, silvery, downwardly directed and well-trimmed hairs.

Abundant in cultivated fields, on road side and waste lands.

Ethnobotanical uses:

The plant is stimulant and diaphoretic. The juice of the leaf

Hyptis suaveolens (Linn.) Poit.

snuffed up the nostrils is used as a remedy in snake bites, and for headache and colds. The flowers are anti-rheumatic.

Flowering & Fruiting: Rainy and winter season.

Local Name: 'Gumma'

Siddiqui 31023, Shah Nagar.

5. **Hyptis** Jacq., non. cons.

Hyptis suavelens (Linn.) Poit. in Ann. Mus. Paris 7:472, t. 29, f. 5, 1836; HK. f. in FBI. 4:630, 1885; Mukerjee in Rec. Bot. Surv. Ind. 14(1):63, 1940; Raizada in Ind. For. Rec. (n. s.) Botany 4(3):70, 1950; Backer & Bakh. f. Fl. Java 2:634, 1965; HFDD. 409, 1977.

Ballota suavelens Linn. Syst. (ed. 10) 1100, 1759.

A tall aromatic herb. **Stem** quadrangular, rigid, hyspid. **Leaves** patioled, ovate, cordate, denticulate, pubescent, villous, adaxially as well as abaxially. **Flowers** in axillary and terminal panicles, blue in colour. **Calyx** strongly 10-nerved, enlarging in fruits. **Stamens** 4, didynamous; filaments densely villous. **Nutlets** oval, obovate, slightly compressed, rugose.

Commonally found on road sides.

Flowering & Fruiting: September-February.

Siddiqui 31150, Pihani road.

6. **Nepeta hindostana** (Roth.) Haines, Bot. Bih. Orissa 744, 1922; Mukerjee, Rec. Bot. Surv. Ind. 14:133, 1940; HFDD. 414, 1977.

Glechoma hindostana Roth., Nov. Pl. Sp. 259, 1821.

Nepeta ruteralis Buch.-Ham. ex Benth in Wall. Pl. As. Rar. 1:64, 1821; FBI. 4:661, 1885; FUGP. 2:117, Repr. ed. 1960.

An annual pubescent erect herb with erect or ascending branches. **Stem** many, quadrangular. **Leaves** long patioled, hairy, ovate or ovate-cordate, acute, coarsely crenate, base some time unequal; whorls few flowered; bracts setaceous, hairy, acute, single nerved. **Calyx** 5 toothed, tubular, tips pink. **Corolla** 2-liped, rose or bluish with dark pink spots in throats, hairy outside, except lower parts of the tube; upper lip shorter and notched; lower lip longer, hairy inside; middle lobe largest and retuse. **Stamens** 4, posterior pair longer. **Nutlets** minute, oblong ellipsoid, white spotted.

Common. Found along water coarses and other moist and shaddy places.

Flowering & Fruiting: Cold season.

Siddiqui 3155Ø, Hasia.

7. **Anisomeles** R. Br.

Anisomeles indica (Linn.) O. Kuntze, Rev. Gen. Pl. 2:512, 1891; Mukerjee, Rec. Bot. Surv. Ind. 14:152, 194Ø; Backer & Bakh f. Fl. Java 2:624, 1965; HFDD. 4Ø6, 1977.

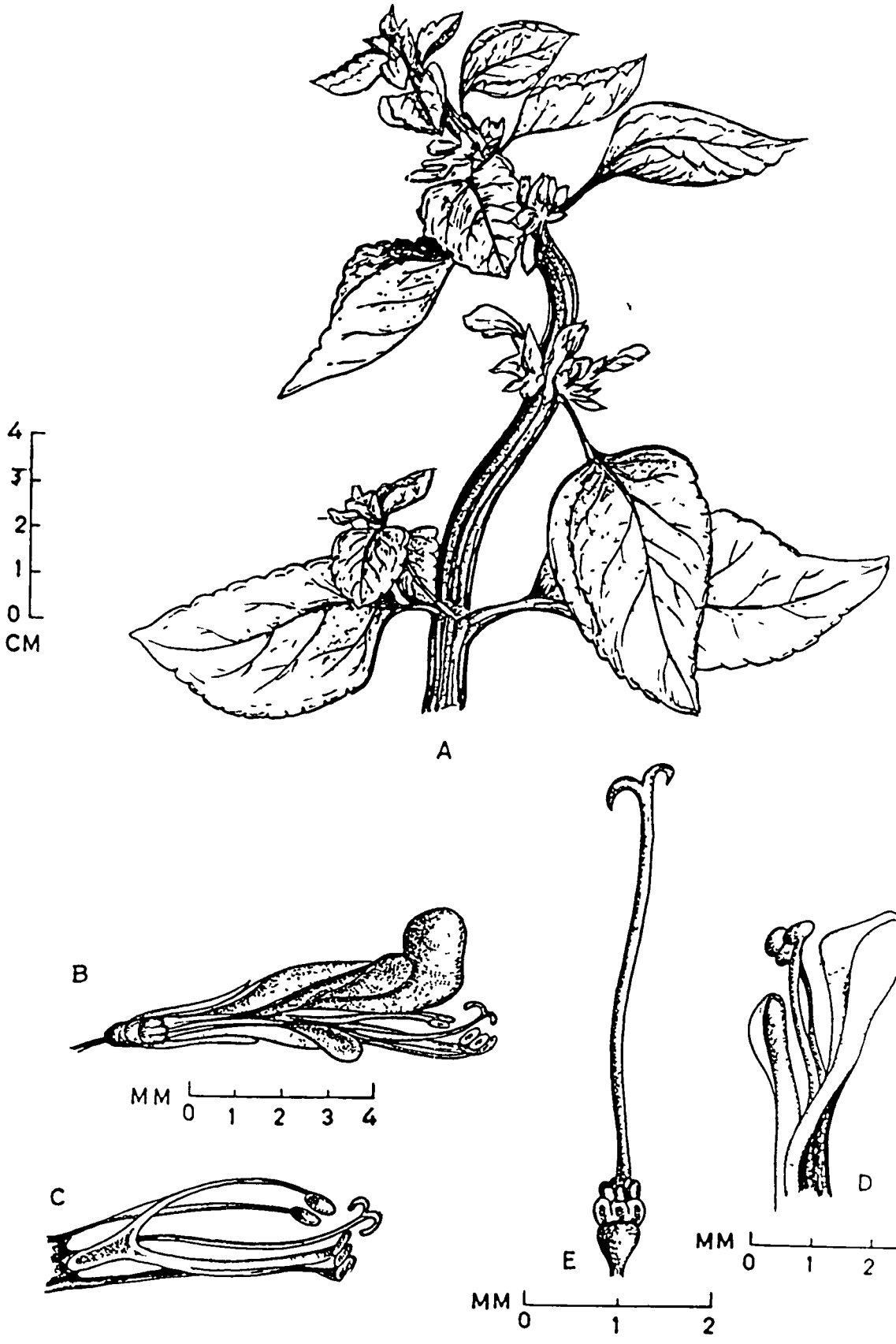
Nepeta indica Linn. Sp. Pl. 571, 1753.

Anisomeles ovata R. Br. in W. Ait. Hort. Kew, ed. 2. 2:264, 1811; FBI. 4:672, 1885; FUGP. 2:1Ø9, Repr. ed. 196Ø.

Epimereti indicus (Linn.) Rothm. Fedde. Reprt. 53:12, 1944.

Erect, aromatic, densely hairy, annual herb (some times

Anisomeles indica (Linn.) O. Kuntze
A. Flowering twig, *B.* Flower, *C.* Stamens, *D.* Flower part (enlarged), *E.* Pistil showing gynobasic style.



Anisomeles indica (Linn.) O. Kuntze

perennial). **Stem** quadrangular, each face grooved. **Leaves** ovate-lanceolate, rather thick, base rounded to cuneate, crinate-serrate, apex acute. **Verticillasters** many flowered, combined to form a dense terminal penicle. **Bracts** linear, entire and single nerved. **Calyx** gland dotted; upper half hairy inside too; lower glabrous. **Corolla** tube hairy outside and lower lip with purple hairs inside, there is a ring of hairs at the base inside the tube, near the ovary. **Nutlets** ovate, shinning.

Common, grows gregariously along the 'pagdandies'(Earthen roads).

Flowering & Fruiting: Round the year.

Siddiqui 31391, Lakhimpur road.

8. Leonotis R. Br.

Leonotis nepetaefolia (Linn.) W. Ait. Hort. Kew, ed. 2. 409, 1811; FBI. 4:691, 1885; FUGP. 2:160, Repr. ed. 1960; HFDD. 410, 1977.

Phlomis nepetaefolia Linn. Sp. Pl. 586, 1753.

A tall erect, hairy annual. **Stem** 4-angled, sulcate. **Leaves** petioled, whitish hairy, ovate, crenate, acute, base cuneate. **Whorls** axillary, dense, globose. **Bracts** linear, deflexed, spine-tipped. **Corolla** deep orange, upper lip densely orange woolly and lower lip with 3-parallel rings of white hairs inside.

Not uncommon, found along the road sides.

Flowering & Fruiting: September-February.

Siddiqui 31265, Sitapur road.

The following plants are often cultivated in gardens, parks and private houses.

1. *Ocimum basilicum* Linn. Sp. Pl. 597, 1753; FBI. 4:608, 1885; Mukerjee Lab. Ind. Emp. 18, 1940; FUGP. 2:99, Repr. ed. 1960; HFDD. 415, 1977.

A much branched, erect herb. **Leaves** ovate-lanceolate. **Flowers** in distant verticillasters, combined into 10-20 cm long raceme. **Corolla** 2-labiate. **Stamens** 4, deflexed, exerted. **Nutlets** obovoid, black.

Often cultivated in houses and in the premises of temples.

Ethnobotanical uses:

The plant is stomachic, carminative, expectorant, anti-spasmodic, mild sedative. An infusion is some times used for chronic gastritis, stomach pain, constipation, respiratory disorders such as cough and wooping cough, and for urinary infections.

Flowering & Fruiting: Almost round the year.

Local Name: 'Tulsi'

Siddiqui 31005, Hardoi.

2. *Ocimum sanctum* Linn. Mant. 1:85, 1767; FBI. 4:609, 1885; Mukerjee Lab. Ind. Emp. 19, 1940; FUGP. 2:98, Repr. ed. 1960.

An under shrub often much branched, woody at base. **Leaves** ovate-oblong or elliptic-oblong, glandular-pubescent, especially on nerves beneath. **Flowers** in vertcillasters, combined into 5-10 cm long racemes. **Calyx** tube, densely glandulose, purple or green. **Corolla** 2-labiate. **Nutlets** broadly ellipsoid.

Often cultivated in gardens, parks and houses.

Ethnobotanical uses:

The herb is expectorant, stomachic, stimulant, anti-periodic, anti-catarrhal, diaphoretic and are used as *ocimum basilicum*.

Flowering & Fruiting: Almost throughout the year.

Local Name: 'Tulsi'

Siddiqui 31010, Hardoi.

3. *Mentha spicata* Linn. Sp. Pl. 576, 1753; Bailey, Man. Cult. Pl. 863, 1949.

Mentha viridis Linn. Sp. Pl. 804, 1763.

A sub erect, perinnial, aromatic herb. **Stem** somewhat woody at base, young branches herbaceous, delicate. **Leaves** ovate-lanceolate, serrate.

Cultivated in kitchen gardens.

Flowering & Fruiting: No flowering and fruiting has been observed.

Siddiqui 31040, Hardoi.

4. *Salvia splendens* Sell. ex R. & S. Syst. Veg. Mant. 1:185, 1822.

An erect annual herb. **Leaves** ovate-oblong, serrate, acuminate. **Flowers** in 2-6 flowered verticillasters, arranged in terminal racemes. **Calyx** tubular-campanulate, patioled. **Corolla** 2-labiate, scarlet-red. **Stamens** 4, lower pair fertile, upper pair redumentary or lacking. **Nutlets** slightly compressed, ovoid,

3-edges.

Cultivated in gardens for its bright coloured flowers.

Flowering: December-February; **Fruiting:** March-April.

Siddiqui 31Ø85, S.P. Lodge, Hardoi.

LXXXIV. PLANTAGINACEAE

Plantago Linn.

Plantago major Linn. Sp. Pl 112, 1753; FBI. 4:705, 1885; FUGP. 2:123, Repr. ed. 1960; Pilger, Pfreich. 102:41, 1937; HFDD. 422, 1977.

An erect, glabrous perennial herb, with short slender or stout rhizome. **Leaves** radical, broadly ovate or oblong-ovate, toothed or nearly entire; petiole long. **Flowers** on long peduncled spikes, cylindric, dense to lax or interrupted; bracts ovate-oblong, margins scarious. **Sepals** 4, connate, lobes oval-oblong. **Petals** 4, corolla tube long, lobes reflexed and spreading at length. **Stamens** 4, inserted at the base or slightly higher in the corolla tube. **Fruits** 2-celled, ovoid, oblong capsule, circumscissile in the lower half.

Occassionally found on the bank of the river.

Flowering & Fruiting: January-May.

Siddiqui 31020, Bhaseta.

LXXXV. NYCTAGINACEAE

Key to Genera:

Spiny, straggling shrubs with brightly coloured bracts .....*1. Bougainvillea*

Unarmed small herbs, bracts not coloured.

Flowers showy, in a calyx - like involucre .....*2. Mirabilis*

Flowers small, in heads of umbels, bracts minute .....*3. Boerhavia*

1. Bougainvillea Comm. ex Juss. Corr. Spach, nom. cons.

Key to species:

Perianth tube densely pubescent; leaves and stem pubescent .....1. *B. spectabilis*

Perianth tube more or less pubescent; leaves and stem subglabrous .....2. *B. glabra*

1. Bougainvillea spectabilis Willd. Sp. Pl. 2:348, 1799; Bailey in Man. Cult. Pl. 358, 1949.

A woody, scandent or straggling shrub, climbing with help of hooked thorns. **Leaves** and **Stem** pubescent, leaves ovate to orbicular ovate. **Flowers** small, yellow, clustered at the ends of branches. **Bracts** 3 large, red and showy exceeding the flowers. **Achenes** 5-ribbed.

Commonly cultivated in gardens and lawns of its handsome bracts.

Flowering: January-June.

Siddiqui 31328, Hardoi.

2. **Bougainvillea glabra** Choisy in DC. Prodr. 13(2):437, 1849; Bailey loc. cit.

A scandent or straggling shrub. **Leaves** and **Stem** glabrous or subglabrous. **Spines** straight or almost lacking. **Leaves** broad, ovate to ovate-oblong. **Bracts** magenta or purple coloured.

Cultivated in gardens.

Snow Queen (white), Mrs. Buck (deep-rose), Mrs. Butt. (deep-crimson) and Mary Palmer (bi-coloured, deep-rose and white flowers on the same plant) are the common varieties grown within the area. *Thimma* a varigated variety has become very popular now-a-days.

Siddiqui 31327, Hardoi.

2. **Mirabilis** Linn.

Mirabilis jalapa Linn. Sp. Pl. 177, 1753; FUGP. 2:129, Repr. ed. 1960; HFDD. 424, 1977; FPP. 219, 1978.

Erect, branched herb with a tuberous root. **Stem** red, swollen at the nodes. **Leaves** ovate-triangular, cuneate, cordate at the base. **Flowers** in axillary leafy corymbs **Perianth** 5-fid, variously coloured, red, pink, white or spotted. **Stamens** 5 (-3), exserted. **Fruits** ellipsoid, ribbed or rugose, black to dark brown.

Often cultivated in gardens and parks. Also found as as escape.

Ethnobotanical uses:

Paste of the leaves are applied to hasten the maturation of boils and abscesses, buboes. The fresh juice of the leaves is very soothing, and is applied to the body in urticaria to allay the

heat and itching. The root is a mild purgative.

Flowering & Fruiting: July-December.

Local Name: 'Gulabas'

Siddiqui 31004, Hardoi.

3. **Boerhavia** Linn.

Key to species:

Prostrate herbs; leaves in unequal pairs;
flowers subsessile .....1. *B. diffusa*

Scandent herbs; leaves in equal pairs;
flowers long pedicelled .....2. *B. chinensis*

1. **Boerhavia diffusa** Linn. Sp. Pl. 3, 1753; FUGP. 2:17, Repr. ed. 1960; HFDD. 423, 1977; FPP. 218, 1978.

Boerhavia repens Linn. Sp. Pl. 3, 1753; FBI. 4:709, 1885.

Boerhavia diandra Linn. Sp. Pl. 2:1149, 1753.

A prostrate to suberect herb. **Stem** slender, nodes swollen. **Leaves** opposite in unequal pairs, broadly ovate to orbicular; slightly fleshy, white beneath. **Flowers** in small umbels. **Perianth** constricted below the middle, rosy purple or bright pink, glandular hairy and greenish in lower half. **Stamens** 2. **Style** 1; stigma peltate. **Fruit** clavate, 5-ribbed, glandular.

Abundant in waste places, sometimes in walls.

Ethnobotanical uses:

The plant is a better, stomachic, laxative and diuretic, and is used in dropsy, jaundice, strangury and internal inflammations.

Powder of the root is used as laxative and as expectorant in asthma. Decoction prepared with Neem bark and ginger is used in ascites, cough, jaundice, difficult breathing.

Flowering & Fruiting: Nearly round the year.

Local Name: 'Thikri'

Siddiqui 30309, Hasia.

2. **Boerhavia chinensis** (Burm. f.) Druce in Rep. Bot. Exch. Club Brit. Isles 1913(3):415, 1914; FPP. 218. 1978.

Valeriana chinensis Burm. f. Fl. Ind. 15. t. 6. f. 3, 1968.

Boerhavia repanda Willd. Sp. Pl. 1:22, 1797; FBI. 4:709, 1885.

A straggling, scandent herb; internodes longer than of *B. diffusa*; nodes swollen. **Leaves** ovate, repand-sinuate. **Flowers** 3-5 together in umbellate manner, pink; pedicel long. **Perianth** 5-lobed, gland pubescent, upper part pink. **Stamens** 3-4, much exserted. **Fruits** sub-clavate, glandular pubescent.

Often found among the hedges.

Flowering & Fruiting: April-November.

Siddiqui 31312, Atwa.

LXXXVI. AMARANTHACEAE

Key to Genera:

Erect herbs (rambling in case of *Pupalia* and *Aerva*).

Flowering spikes, white, silvery-white or red.

Perianth villous.

Stamens free in upper part, slightly connate near base.

Tall rambling herbs; stamens 5, with interposed staminodes .....1. *Aerva*

Small erect herbs; stamens 2, staminodes none .....2. *Nothosaerva*

Stamens forming a tube.....3. *Gomphrena*

Perianth glabrous.

Perianth pure pink; fruit a crustaceous nut .....4. *Digera*

Perianth shining silvery, with purple tinge; fruit circumscissile .....5. *Celosia*

Flowering spikes green (not silvery

or white).

Fruit spinescent; flowers two-sexual; leaves opposite.

Fruit with stellately spreading hooked awns .....6. *Pupalia*

Fruit with paired, straight spines (bracteoles).....7. *Achyranthes*

Fruit not spinescent; leaves alternate; flowers monoeaceous or polygamous .....8. *Amaranthus*

Prostrate (sometimes ascending) herbs.

Spikes axillary; filaments free.

Leaves alternate; anthers two-celled .....8. *Amaranthus*

Leaves opposite; anthers one-celled .....9. *Alternanthera*

Spikes terminal; filaments connate to form a tube .....3. *Gomphrena*

1. **Aerva** Forck. nom. cons.

Aerva scanguinolenta (Linn.) Bl. Bijdr. 547, 1825; Backer, Fl. Males. Ser. 1. 4:85, 1949.

Achyranthes sanguinolenta Linn. Sp. Pl. ed. 2. 294, 1762.

Aerua scandens Wall. (Cat. n. 6911, 1835, nom. nud.) ex Moq. in

DC. Prodr. 13:3Ø2, 1849; FBI. 4:727, 1887; FUGP. 2:138, Repr. ed. 196Ø.

A scandent or climbing undershrub with long hoary tomentose, terete branches; older branches often red or purple tinged, swollen at the nodes. **Leaves** opposite below and alternate above, elliptic-lanceolate or ovate, obtuse or acute and mucronate, glabrous or softy hairy, normally densely pubescent on under surface; base tapering into a petiole. **Flowers** silvery-white, bi-sexual; arranged in ovoid or cylinderic axillary and terminal subsessile, white woolly spikes; spikes often paired. **Bracteoles** shorter than the perianth, ovate, acuminate, hairy on the back, hyaline with a median green band. **Stamens** 4, with alternating staminodes, all connate basally to form a cup around the ovary. **Seeds** lenticular, black and shining.

Common, among the hedges and undergrowth in orchard.

Flowering & Fruiting: August-March.

Siddiqui 31277, Mama purva.

2. **Nothosaerva** Wight

Nothosaerva brachiata (Linn.) Wight, Icon. 6:1, 1853; FBI. 4:726, 1885; FUGP. 2:139, Repr. ed. 196Ø; FPP. 225, 1878.

Achyranthes brachiata Linn. Mant. 1:5Ø, 1767.

A branched, dwarf annual herb. **Leaves** elliptic-ovate to lanceolate, thinly herbaceous. **Flowers** in axillary, slender, stout, clustered spikes; bracts ovate; bracteoles 2, scarious. **Perianth lobes** pilose outside, oblong acute. **Stamens** 2, rarely 1;

filaments short, membranous; anthers 2-celled, minute. Fruits a utricle, membranous, 1-seeded.

Rare, sometimes found among the undergrowth in Mango orchards.

Flowering & Fruiting: August-January.

Siddiqui 31248, Reddupur.

3. **Gomphrena** Linn.

Gomphrena celosioides Mart. Beitr. Amar. 193, 1825 and in Nov. Act. Nat. Curr. 13:3Ø1, 1826; Moq. in DC. Prodr. 13(2):41Ø, 1849; Sandwith in Kew Bull. 1946:291, 1946; Backer in Fl. Males. Ser.1. 4(2):96, 1947; Raizada in Ind. For. Rec. (n. s.) Bot. 4(3):71, 195Ø; C. C. Townsand in Fl. W. Pakistan 71:44, 1974.

Gomphrena decumbens Sensu Gamble, Fl. Madras 12(7):1179, 1925 et auct. Pl. non. Jacq.

An erect or ascending herb. **Stem** white tomentose, somewhat swollen and tinged with red at the nodes. **Leaves** oblong, lanceolate, obtuse, finely appressed hairy beneath; nerves obscure adaxially. **Flowers** in subglobose, elongating heads, at maturity fruits fall away leaving the necked rachis; bracts and bracteoles navicular; bracteole with dorsal crest. **Perianth** lobes 5, narrowly, lanceolate, densely white, long woolly. **Stamens** 5, filaments connate to form staminal tube, 5-1Ø toothed. **Fruits** compressed utricle. **Seeds** light brown.

Abundant on road sides, water-lands and grass-lands.

Flowering & Fruiting: February-November.

Siddiqui 31551, Hasia.

4. **Digera** Forsk.

Digera muricata (Linn.) Mart. Beitr. Amar. 77. n. 2, 1825; Backer, Fl. Males. Ser. 1. 4:80, 1949; Backer & Bakh. f. Fl. Java, 1:235, 1963; FPP. 224, 1978.

Achyranthes muricata Linn. Sp. Pl. ed. 2. 295, 1762.

Achyranthes alternifolia Linn. Mant. Pl. 50, 1762.

Digera arvensis Forsk. Fl. Aegypt. -Arab. 65, 1775; FBI. 4:717, 1885; FUGP. 2:132, Repr. ed. 1960.

Digera alternifolia (Linn.) Aschers. in Schweinf. Beitr. Fl. Aethiop. 180, 1867; Schinz, Pflanzenfam. ed. 2. 16c:40, 1934.

Erect-ascending, often branched from the base, annual, glabrous herb. Stem flexuous. Leaves ovate-lanceolate to oblong, entire, acute. Flowers subsessile in axillary, peduncled, spiciform racemes, terete, 2 outer reduced to scales the middle one perfect. Perianth not scarious, segments 5, oblong, pink, persistent. Stamens 5, filaments filiform; anthers 2-celled. Fruit utricle, compressed, crustaceous. Seeds 1, minutely rugose.

Commonly in cultivated fields.

Flowering & Fruiting: August-November.

Siddiqui 31381, Baturi purva.

5. **Celosia** Linn.

Celosia argentea Linn. Sp. Pl. 205, 1753; FBI. 4:714, 1885; FUGP. 2:131, Repr. ed. 1960; Backer, Fl. Males. Ser. 1. 4:73, 1949; HFDD. 432, 1977.

Celosia cristata Linn. Sp. Pl. 205, 1753.

Celosia coccinea Linn. Sp. Pl. ed. 2:297, 1762.

An erect, glabrous annual herb. **Stem** sulcate. **Leaves** lanceolate, ovate, acuminate; lower leaves petioled, upper sessile. **Flowers** in ovate, acute spikes; bracts and bracteoles broadly lanceolate, mucronate. **Perianth lobes** 5, ovate, lanceolate, white with a pink tinge. **Stamens** 5, filaments connate below into a cup; anthers purplish. **Style** purplish. **Seeds** lenticular, black polished.

Common in sugar-cane, *Sorghum* and *Cajanus* fields.

Ethnobotanical uses:

Plant is used in diarrhoea and as an aphrodisiac.

Flowering: August-October; **Fruiting:** September-November.

Local Name: 'Murgh-kesri'

Siddiqui 31532, Saktapur.

6. **Pupalia** Juss., nom. cons.

Pupalia lappacea (Linn.) Juss. Ann. Mus. Paris 2:132, 1803; FBI. 4:724, 1885; FUGP. 2:141, Repr. ed. 1960; Backer, Fl. Males. Ser. 1. 4:83, 1949; HFDD. 435, 1977; FPP. 225, 1978.

An erect, rambling or scrambling, often much branched, perennial herb. **Stem** bluntly quadrangular; nodes swollen. **Leaves** opposite, ovate-oblong; base tapering or rounded, apex acute, entire, appressed hairy, petioled. **Flowers** in terminal and axillary lax spikes ; each cluster comprises 2-3 perfect pilose. **Perianth** tepals 5, ovate-oblong, sharply tipped. Stamens 5, filaments short connate at the base; anthers 2-celled. **Stigma** capitallate.

Fruit a membranous utricle, abruptly narrowed to the apex. Seeds compressed, black and shining.

Abundant, found among the hedges.

Flowering & Fruiting: Rainy season.

Siddiqui 31372, Hasia.

7. Achyranthes Linn.

Achyranthes aspera Linn. Sp. Pl. 204, 1753; FBI. 4:730, 1885; FUGP. 2:140, Repr. ed. 1960; Backer, Fl. Males. Ser. 1. 4:88, 1949; HFDD. 426, 1977.

Erect, stiff, annual-perennial, simple or branched herb. Stem quadrangular, swollen, at the nodes. Leaves elliptic-obovate, appressed hairy when young and sub-glabrous later. Flowers in terminal and axillary long spikes, greenish-white, deflexed; bracteate and bracteolate; bracteoles paired, spinescent, pink. Perianth segments 5, whitish-green, scarious margined, acute, 3-nerved. Stamens 5, filaments connate at the base; pseudo-staminodes with fringed scales. Fruit a thin walled utricle, enclosed in hardened perianth. Seeds 1.

Abundant. Found on road sides, waste places, fallow lands and old walls.

Ethnobotanical uses:

The plant is used as purgative, pungent, digestive; a remedy for phlegm, inflammation of internal organs, piles, itch, abdominal enlargements. Juice is used in toothache. Ash with honey are given in cough. Root is used in night blindness and abortion

while leaves are used to prevent the separations of the foetus from the placenta and habitual abortion.

Flowering & Fruiting: Throughout the year except May and June.

Local Name: 'Latzeera'

Siddiqui 31Ø31, Pihani Road.

8. **Amaranthus** Linn.

Key to species:

Erect or ascending herbs; leaves more than 1 cm long.

Leaf axils with long spines.....1. *A. spinosus*

Leaf axils without spines.

Perianth segments and stamens five; fruit circumscissile .....2. *A. cruentus*

Perianth segments and stamens three; fruit usually indehiscent .....3. *A. viridis*

Prostrate herbs; leaves not more than 1 cm long; clusters all axillary .....4. *A. roxburghianus*

1. **Amaranthus spinosus** Linn. Sp. Pl. 991, 1753; FBI. 4:718, 1885; FUGP. 2:133, Repr. ed. 196Ø; HFDD. 431, 1977.

Amaranthus spinosus var. *inermis* Schinz, Pflanzenfam. ed. 2. 16c:35, 1934.

Erect spinous herb. Stem terete, glabrous, often tinged with red;

branches with one or two depressed lines running between the nodes. **Spines** borne in leaf axiles, yellow when mature. **Leaves** ovate and lanceolate, apex notched, with a bristle, glabrous above, main lateral nerves 7-8 pairs, more prominent on abaxial surface, petiole shorter than the blade. **Flowers** numerous, sessile in axillary clusters and terminal, more or less interrupted, spikes. **Bracts** usually shorter than the tepals, linear and usually spine tipped. **Male perianth** ovate, acute, bristle tipped and segments apiculate boat-shaped. **Female perianth** much smaller and with oblong-obtuse, apiculate segments. **Stamens** five; anthers yellow. **Styles** 2, spreading and hairy inside. **Fruits** ovoid, thicked above, membranous, rugose, circumscissile. **Seeds** black, shining.

Abundant, found in waste places, road sides and near brick kilns.

Ethnobotanical uses:

Root is used in gonorrhoea and eczema. Whole plant is used in colic.

Flowering: July-October; **Fruiting:** September-November.

Local Name: 'Jangli-choulai'

Siddiqui 31049, Shah Nagar.

2. **Amaranthus cruentus** Linn. Syst. Nat. ed. 10. 1269, 1759; Duke, Ann. Miss. Bot. Gard. 48:15, 1961; HFDD. 430, 1977.

Amaranthus paniculatus Linn. Sp. Pl. ed.2. 1406, 1763; FBI. 4:718, 1885; FUGP. 2:134, Repr. ed. 1960.

Amaranthus hybridus Linn. subsp. *cruentus* (Linn.) Thell. var.

Paniculatus (Linn.) Thell. in Asch. & Gray, Syn. 5(1):247, 1914.

An erect, branched, robust herb. **Leaves** ovate-oblong. **Flowers** in drooping, broad, terminal panicles. **Perianth segments** 5, reddish-brown; margins scarious; accrescent. **Stamens** 5. **Styles** 3, short. **Fruit** ovoid, narrowing to apex. **Seeds** dark-red or black, shining.

Common. Found in cultivated in fields, along water courses.

Flowering: September-October; **Fruiting:** November-December.

Local Name: 'Lal-choulai'

Siddiqui 31Ø44, Shah Nagar.

3. **Amaranthus viridis** Linn. Sp. Pl. ed. 2. 14Ø5, 1763 (quad descr. et Herb. Linn. excl. ref. Bauhin & Tournefort); FBI. 4:72Ø, 1885; FUGP. 2:136, Repr. ed. 196Ø; Merr. Amer. Journ. Bot. 23:6Ø9-612, 1936; Duke, Ann. Miss. Bot. Gard. 48:14, 1961; Brenan, Watsonia 4:275, 1961.

Amaranthus gracilis Desf. Tabl. Encycl. 43, 18Ø4; Backer, Fl. Males. Ser. 1. 4:76, 1949; Backer & Bakh. f. Fl. Java. 1:235, 1963.

Erect much branched annual herb, glabrous; branches sulcate, often, especially the older parts, tinged with purple. **Leaves** ovate or deltoid; base unequal, apex notched, with a small bristle; main lateral nerves 6-8 pairs, petiolate. **Flowers** shortly stalked, arranged in few flowered axillary clusters and in slender axillary and terminal panicled spikes; bracts shorter than the perianth lobes, ovate-oblong, acute, membranous, with a single green nerve (keel). **Tepals** 3. **Stamens** 3, filaments

hyaline, membranous; anthers yellow. Styles 2, hairy. Fruit indehiscent, compressed, suborbicular, acute, rugose. Seeds minute, lenticular, dark purple and polished.

Abundant on road sides, gardens grass-lands and old walls.

Ethnobotanical uses:

Leaves and roots are used in eczema and ringworms. Root paste is used in snake bite.

Flowering: September-November; **Fruiting:** October-December.

Local Name: 'Choulai'

Siddiqui 31Ø11, Hardoi.

4. **Amaranthus roxburghianus** Nevski in Acta Inst. Bot. Acad. Sc. USSR Ser. 1. Fasc. 4:311, 1937; Nair in Journ. Bot. Nat. Hist. Soc. FPP. 223, 1978.

Amaranthus polygonoides auct. non. Linn.; Roxb. Fl. Ind. 3:6Ø2, 1832; Nair in Bull. Bot. Surv. India 8:89, 1966.

Amaranthus polygamous auct. non Linn.; Hook. f. FBI. 4:721, 1885; FUGP. 2:137, Repr. ed. 196Ø.

This plant is quite easy to recognise in the field because of its prostrate habit, smaller leaves and flowers in axillary clusters.

Commonly found on road sides, as a weed in lawns and sometimes on walls.

Flowering & Fruiting: April-September.

Siddiqui 31Ø62, Lucknow Road.

9. **Alternanthera** Forsk.

Key to species:

Spikes not spinescent; leaves narrow.....1. *A. sessilis*

Spikes spinescent; leaves broad.....2. *A. pungens*

1. **Alternanthera sessilis** (Linn.) R. Br. ex R. & S. Syst. 5:554, 1819; FBI. 4:731, 1885; FUGP. 2:142, Repr. ed. 1960.

A prostrate, extensively ranified glabrascent herb. **Stem** terete, with scattered curly hairs. **Leaves** show much variation, from oblong-ovate to lanceolate, narrow, entire. **Flowers** in axillary, purple tinged, subglobose, solitary spikes. **Perianth** lobes 5, white, scarious, narrowly ovate. **Stamens** 3 (rarely 2); anthers 1-celled. **Fruit** utricle, 1-seeded, broadly obcordate. **Seeds** reddish-brown, shining.

Abundant along the water courses and margins of ponds and ditches.

Ethnobotanical use:

Plant is used in snake bite.

Flowering & Fruiting: August-January.

Local Name: 'Girni'

Siddiqui 31249, Reddupur.

2. **Alternanthera pungens** H. B. K. Nov. Gen. et. Sp. 2:206, 1817; Raizada inInd. For. 76:495, 1950; Town-sand in Fl. W. Pakistan 71:39, 1974; Santapau, Fl. Saurashtra 225, 1967; Baker & Bakh. f. Fl. Java. 1:238, 1963; Melville in Kew Bull. 1950:174, 1958;

Suppl. FUGP. 233, 1976.

Achyranthes repens Linn. Sp. Pl. 205, 1753.

Illecebrum achyrantha Linn. Sp. Pl. (ed. 2). 299, 1762.

Alternanthera achyrantha R. Br. Prodr. 417, 1810.

(non *Alternanthera achyranthes* Forsk. 1775)

Alternanthera repens (Linn.) Link. Enum. Fl. Hort. Berol. 1:154, 1821 (non J. F. Gmel, 1791); Backer in Fl. Males. Ser. 1. 4(5):91, 1949.

This species can be readily distinguished by its broader oblong, orbicular leaves and spinescent spikes.

Not common. Occassionally occurs in sandy soils.

Flowering & Fruiting: April-October.

Siddiqui 31519, Atwa.

LXXXVII. CHENOPODIACEAE

Chenopodium Linn.

Key to species:

An aromatic herb .....1. *C. ambrosioides*

Non-armatic herbs.

Seeds dull black .....2. *C. murale*

Seeds shining .....3. *C. album*

1. **Chenopodium ambrosioides** Linn. Sp. Pl. 219, 1753; FBI. 5:4, 1886; HFDD. 437, 1977.

a strongly scented, annual herb, young parts glandular hairy. **Leaves** broadly to narrowly ovate-lanceolate, coarsely and irregulary dentate, lateral veins and their branches prominent. **Flowers** in leafy penicles. **Perianth** lobes 3-5, ovate-triangular. **Stamens** 2-5. **Utricle** depressed-globose, gland dotted. **Seeds** dark-brown, polished.

Common in waste places, especially near water channels.

Flowering & Fruiting: march-October.

Siddiqui 31267, Mama purva.

2. **Chenopodium murale** Linn. Sp. Pl. 219, 1753; FBI. 5:4, 1886; FUGP. 2:144, Repr. ed. 1960; HFDD. 437, 1977.

A branched, annual herb, younger parts white-mealy. **Leaves** ovate-rhomboid, coarsely crenate-dentate. **Flowers** in axillary and terminal penicles, densely clustered. **Perianth** lobes 5. **Stamens** 5. **Utricles** depressed-globose, enclosed by perianth lobes. **Seeds**

lenticular-circular, dull black, reticulate.

Common weed in fields, along road sides and also on walls.

Flowering & Fruiting: November-March.

Siddiqui 31Ø32, Hardoi.

3. Chenopodium album Linn. Sp. Pl. 219, 1753; FBI. 5:3, 1886; FUGP. 3:143, Repr. ed. 196Ø; HFDD. 437, 1977.

Erect, simple, often much branched annual herb. **Stem** angular, ribbed, often red streaked, glabrous except white-mealy (powdery vesicles) young parts. **Leaves** fleshy, ovate, elliptic-oblong, coarsely serrate-dentate. **Flowers** in peniculate clusters. **Perianth** segments 5, with a broad, green band. **Stamens** 5. **Utricles** depressed, globose, finely pepillate, single seeded. **Seeds** compressed-lanticular, dark brown, shining, smooth.

Abundant in wheat fields.

Flowering & Fruiting: December-March.

Siddiqui 31Ø36, Bilgram Road.

The following plants are commonaly cultivated in gardens.

1. Spinacia Linn.

Spinacia oleracea Linn. Sp. Pl. 1Ø27, 1753; FBI. 5:6, 1886; HFDD. 438, 1977.

An erect herb. **Stem** with red streaks. **Radical leaves** ovate-oblong long petioled, somewhat fleshy; upper ones smaller, sessile. **Male Flowers** in spikes and female ones in lower axils. **Fruit** enclosed in spiny bracts.

Cultivated for the sake of leaves used as vegetable.

Ethnobotanical uses:

The juice of the leaves is used as a diuretic and as gargle in sore throat. Poultice of leaves or boiled seeds are applied to softened tumors and promote the maturation of boils.

Flowering: March-April; Fruiting: May-June.

Local Name: 'Palak'

2. Kochia Roth.

Kochia scoparia Linn. Sp. Pl. 221, 1753.

An annual profusely branched herb, light green in colour; branches together forming a dense globose-oblong crown. Leaves narrowly oblanceolate to linear. Flowers in axillary clusters, 5-merous, utricles depressed globose, enveloped in perianth lobes, 1-seeded. Seeds broadly ovate.

Extensively cultivated as pot plant as well as in beds.

Flowering & Fruiting: August-September.

3. Beta Linn.

Beta vulgaris Linn. Sp. Pl. 32, 1753; FBI. 5:5, 1886; HFDD. 436, 1977.

An annual herb. Root fleshy, napiform, dark violet-red. Leaves oblong-ovate, petioled; upper ones smaller, linear and finally changed into bracts. Flowers in terminal pennicles. Perianth segments 5, greenish, oblong, obtuse, hooked at the top. Stigma 2-3.

An important crop plant, grown for its roots, which are used as salad and vegetable.

Flowering & Fruiting: April-June.

LXXXVIII. BASELLACEAE

Basella Linn.

Basella alba Linn. var. *rubra* (Linn.) Stewart, Punjab Plants. 177, 1869; Tenjarla *et al*. in Ind. Journ. For. 5(25):152, 1982.

Basella rubra Linn. Sp. Pl. 272, 1753; FBI. 5:2Ø, 1886; FUGP. 2:147, Repr. ed. 196Ø; HFDD. 438, 1977.

Extensively climber with purple fleshy stem and succulent leaves. **Leaves** ovate, obtuse, entire, cordate at the base. **Flowers** in cymose clusters forming spikes, purple in colour, sessile. **Perianth** fleshy, connate basally, purple. **Seeds** black.

Cultivated in kitchen gardens. The leaves locally known as Poi-ka-Saag are made into curry.

Ethnobotanical uses:

Seeds are used for healing of wounds. Leaves are used to stop the bleeding.

Flowering & Fruitng:)ctober-March.

Local Name: 'Poi'

Siddiqui 31533, Saktapur.

LXXXIX. POLYGONACEAE

Key to Genera:

Perianth lobes 6, 2-seriate, inner three enlarging in fruit; stigma fibricate .....*1. Rumex*

Perianth lobes 4-5 or 6, 1-seriate, not enlarging in fruit; stigma capitellate .....*2. Polygonum*

1. **Rumex** Linn.

Key to species:

Accrescent sepals (wings) usually kooked.....1. *R. nepalensis*

Accrescent sepals not hooked in fruit.....2. *R. dentatus*

1. **Rumex nepalensis** Spreng. Syst. 2:159, 1825; FBI. 5:60, 1886; FUGP. 2:158, Repr. ed. 1960; HFDD. 446, 1977.

An erect, much branched, glabrous, perennial herbs. **Basal leaves** long-petioled, ovate-oblong with a cordate base; higher one shorter petioled; all leaves crispy. **Flowers** in whorls combined into leafy racemes. Inner fruiting perianth segments, ovate triangular, dentate with hooked teeth and strongly reticulate.

Commonly found along watersides of irregational canals.

Flowering: February-March; **Fruiting:** May-June.

Siddiqui 31079, Tanskhera.

2. **Rumex dentatus** Linn. Mant. 2:226, 1771; subsp. *klotzschianus* (Meissn) Rech. f. Bein. Bot. Centralb. 49:19, 1932; Candollea 12:119, 1949.

Rumex klotzschianus Meissn. in DC. Prodr. 14:57, 1856.

Rumex dentatus sensu Hook. f. FBI. 5:59, 1886 (non Linn. 1771); FUGP. 2:158, Repr. ed. 1960.

An erect branched or simple annual. **Stem** sulcate, purple below. **Lower leaves** petioled, oblong, narrowly obovate, obtuse, base narrow or cordate; margins entire, the length of petiole decreases gradually towards the apex. **Flowers** in axillary whorls, combined into panicles, pedicels deflexed, inner fruiting tepals denticulate. **Nut** trigonous.

Abundant, near water bodies.

Flowering & Fruiting: January-May.

Siddiqui 31066, Khera.

2. **Polygonum** Linn.

Key to species:

Flowers axillary,pink; small prostrate or ascending herbs; branches growing in all directions from a woody base .....1. *P. plebeium*

Flowers in spikes.

Spikes dense (flowers close set).

Nutlets biconvex.

Bracts hairy; leaves ovate petiole quite long; plant green .....2. *P. orientale*

Bracts glabrous; leaves lanceolate, petiole short;

plant tinged with red .....3. *P. glabrum*

Nutlets trigonous; bracts glabrous.

Ochrea long cileate (cilia longer than the tube) .....4. *P. barbatum*

Ochrea truncate, eciliate.....3. *P. glabrum*

Spikes lax (flowers distant), filiform; leaves and perianth densely gland punctate; nut trigonous, granulate .....5. *P. hydropiper*

1. Plygonum plebeium R. Br. Prodr. 420, 1810; FBI. 5:27, 1886; FUGP. 2:149, Repr. ed. 1960; Danser, Bull. Jard. Bot. Buit. Ser. 3, 8:140, 1927; Steward, Contrib. Gray Herb. 5(88):24, 1930.

A prostrate or decumbent herbs; internodes long or short; ochrea white, eciliate. Leaves small, oblong-lanceolate. Flowers 1-5 in axils, shortly pedicelled, pink; each perianth lobe with a green median streaks. Nutlet 3-gonous, polished.

Common in damp localities, sometimes also on old walls.

Ethnobotanical uses:

Dried plants are used in pneumonia and leaves in skin diseases.

Flowering & Fruiting: October-April.

Local Name: 'Machichi'
Siddiqui 31081, Lucknow Road.

2. Polygonum orientale Linn. Sp. Pl. 362, 1753; FBI. 5:36, 1886; FUGP. 2:152, Repr. ed. 1960; HFDD. 444, 1977.

A large green herb, stem fistular. **Leaves** long petioled, broadly ovate, acute, cordate. **Ochrea** short, truncate. **Racemes** panicled, drooping; flowers greenish-white. **Stamens** 7-8 nutlets orbicular, compressed, black, polished.

Not uncommon, collected from the bank of the Gomti river.

Flowering & Fruiting: Rainy season.

Siddiqui 31019, Tanskhera.

3. Polygonum glabrum Willd. Sp. Pl. 2:447, 1799; FBI. 1886, pro parte; FUGP. 2:153, Repr. ed. 1960.

An erect glabrous annual; lower part of the stem ascending and tinged with red. **Leaves** lanceolate, acute, entire, narrowed at the base, gland dotted. **Ochrea** conspicuously veined, tightly appressed to the internode, eciliate. **Racemes** erect; bracts glabrous. **Perianth** white or pink, not glandular. **Stamens** 6-8. **Style** 2 or 3. **Nutlets** dimorphic, in case of 2-styled flowers the nutlets are biconvex and in case of three styled flowers the nutlets are trigonous.

Abundant in road sides, ditches and near marshy places.

Ethnobotanical uses:

Leaves infusion are used in colic while juice of it is given in pneumonia. Rootstocks are used in piles, jaundice, debility and consumption.

Flowering & Fruiting: Rainy and winter season.

Local Name: 'Nali'

Siddiqui 31Ø39, Khera.

4. **Polygonum barbatum** Linn.

Key to subspecies:

Leaf base acute; lamina without any blotch.....1. *P. barbatum* subsp. *barbatum*

Leaf base usually rounded and lamina blotched with brown .....2. *P. barbatum* subsp. *gracile*

1. **Polygonum barbatum** Linn. Sp. Pl. 362, 1753; FBI. 5:37, 1886; FUGP. 2:154, Repr. ed. 196Ø; Steward, Contrib. Gray Herb. 5:52, 193Ø. subsp. *barbatum* Danser, Bull. Jard. Bot. Ser. 3:8:145, 1927; HFDD. 441, 1977.

Polygonum stagninum Buch. -Ham. ex Meissn. in Wall. Pl. As. Rar. 3:56, 1832; FBI. 5:37, 1886; FUGP. 2:154, Repr. ed. 196Ø.

An erect annual herb, lower part creeping and rooting at the nodes, nodes thickened. **Ochrea** appressed, bubescent; mouth ciliate with cilia longer than the tube. **Leaves** lanceolate, entire, base acute apex acute or acuminate. **Racemes** usually combined into panicles. **Perianth** white or pink, glandular. **Nutlet** trigonous.

Common in marshy or damp localities.

Ethnobotanical uses:

Root an shoot decoction is used in colic, purgative and to wash for ulcers.

Flowering & Fruiting: Winter season.

Local Name: 'Nali'

Siddiqui 31Ø97, Bhaseta.

2. **Polygonum barbatum** Linn. subsp. *gracile* Danser, Bull. Jard. Bot. Buit. Ser. 3. 8:146, 1972.

Polygonum flaccidum Roxb. Fl. Ind. ed. Carey 2:291, 1832 (non Meiss. in DC. 1856); Gage, Rec.Bot. Surv. Ind. 2:399, 19Ø3.

Polygonum serrulatum sensu Hook. f. FBI. 5:38, 1886 [(non Lagase), excl. var. *donii* Hook. f.].

Polygonum barbatum Linn. var. *garcile* (Danser) Steward, Contrib. Gray Herb. 5(88):55, 193Ø.

This taxon differs from the preceding one in the leaves which are rounded or subcordate at the base and the blade with brown blotch.

Not uncommon, found in the marshy localities and near the banks of the Gomti river.

Siddiqui 31Ø94, Bhaseta river.

5. **Polygonum hydropiper** Linn. subsp. *microcarpum* Danser, Bull. Jard. Bot. Buit. Ser. 3. 8:189, 1927, var. *triquetrum* Danser, Bull. Jard. Bot. Buit. Ser. 3. 8:189, 1927.

A selder annual herb, ascending. **Stem** reddish, gland punctate. **Leaves** linear-lanceolate, glandular. **Ochrea** glabrous, glandular, short ciliate or truncate. **Racemes** lax, slender, drooping. **Bracts** and perianth both gland punctate. **Perianth** white or pink. **Stamens** 8. **Nutlets** 3-gonous, granulate.

Common, near water channels and ponds.

Flowering & Fruiting: October-March.

Siddiqui 31520, Atwa.

The following plants are often cultivated.

1. **Antigonon laptopus** Hook. & Arn. Bot. Beech. Voy. 308. t. 69, 1841; Bor. & Raizada, Beaut. Ind. Cl. & Sh. 265, 1954.

A large extensive climber. **Leaves** ovate-cordate, entire. **Flowers** in axillary racemes terminating by a branched tendril, pink in colour; 3-outer perianth lobes larger. **Achenes** enclosed within perianth lobes, 3-angled.

Cultivated abundantly, found as escape also.

Flowering & Fruiting: August-May.

Siddiqui 31009, Hardoi.

2. **Muehlenbeckia** Meissn.

Muehlenbeckia platyclada (F. V. Muell.) Meissn. in Bot. Zeit. 22:313, 1865.

A much branched perennial, under shrub. **Branches** transformed into segmented phylloclades. **Leaves** caducous. **Flowers** pink in axillary few flowered clusters. **Fruit** red when ripe.

Flowering & Fruiting: September-Nivember.

XC. ARISTOLOCHIACEAE

Aristolochia Linn.

Aristolochia elegans Mast. in Gard. Chron. 2:301, 1885; Man. Cult. Pl. 346, 1949; FPP. 322, 1978.

A medium sized climber. **Leaves** simple, alternate, reniform-cordate, petioled. **Flowers** solitary-axillary, pendant, the pedicel longer than the petiole; bracts orbicular. **Perianth** tube, greenish-yellow; limb expanded, shallowly saucer-shaped, cordate at the base; throat purplish-brown, surrounded by purplish-brown and violet streaks. **Stamens** 6; anthers sessile. **Fruit** a capsule, dark brown, hexagonal. **Seeds** brown, flattened.

Planted in gardens.

Ethnobotanical use:

Plant is used for the treatment of snake poisoning.

Flowering & Fruiting: August-November.

Local Name: 'Ishramul'

Siddiqui 31552, Hasia.

XCI. PIPERACEAE

Peperomia Ruiz. & Pav.

Peperomia pellucida (Linn.) HBK. Nov. Gen. Sp. 1:64, 1815; HFDD. 447, 1977; Proctor, Fl. Jamaica, Journ. Arn. Arb. 63(3):323, 1982.

Piper pellucidum Linn. Sp. Pl. 30, 1753.

A decumbent or branched, flaccid annual herb. **Stem** glabrous. **Leaves** alternate, opposite, rounded-deltoid-ovate; base subtruncate-cordate. **Flowers** in terminal-axillary slender, lax, spikes. **Perianth** none; bracts peltate. **Stamens** 2. **Fruits** an indehiscent berry. **Seeds** minute, brown, warty.

Rarely found in shaddy and moist places.

Flowering & Fruiting: January-March.

Siddiqui 31250, Reddupur.

XCII. PROTEACEAE

Grevillea R. Br. ex Kn. nom. cons.

Grevillea robusta A. Cunn. in R. Br. Prot. Nov. 24, 1830; Ind. Tr. 544, Repr. ed. 1971.

A large tree with conicle crown and brownish bark, longitudinally fissured. Young branches rusty tomentose. **Leaves** alternate, bipinnatifid, glabrous and dark green above and brownish tomentose beneath, margins recurved, coriaceous. **Flowers** in 1-5-nate racemes in the axils of defoliated leaves; flowers scund. **Perianth** 4-lobed, recurved a little above the limb, orange-yellow, dark red streaks inside the throat. **Stamens** 4, epiphyllous, filaments none or very small; anthers 2-celled with 2-ovule on parietal placenta; style filiform, stigma dilate. **Fruit** woody boat-shaped folicle, oblique, dorsally splitting. **Seeds** 2, oblong, winged.

Planted in gardens and parks and also as an avenue tree.

Flowering: March-April; **Fruiting:** June-August.

Siddiqui 31326, Hardoi.

XCIII. LORANTHACEAE

Dendrophthoe Mart.

Dendrophthoe falcata (Linn. f.) Etting. Denkschr. Akad. Wissen. Math. -Nat. 32:52, 1852; Danser, Bull. Jard. Bot. Beaut. Ser. 3. 16:30, 1938; HFDD. 449, 1977; FPP. 232, 1978.

Loranthus falcatus Linn. Suppl. Pl. 211, 1781.

Loranthus longiflorus Desr. in Lamk. Encycl. 3:598, 1789; FBI. 5:214, 1886; FUGP. 2:175, Repr. ed. 1960.

A partial stem parasite. **Bark** reddish-brown to grey. **Leaves** opposite or alternate, coriaceous, petiolled, dark-green. **Flowers** yellowish-orange, in short unilateral spikes; bracts ovate-oblong. **Perianth** lobes 4-5; tube **curved**, tips of the lobes reflexed. **Stamens** 5, inserted on the tube. **Ovary** 1-celled, inferior. **Fruit** ovoid-oblond berry, crowned with cup-shaped, persistent, calyx tube.

Common, parasitises on *Ficus religiosa*, *Mangifera indica*, *Psidium guajava*, *Delbergia sissoo* and *Albizia lebbeck* etc.

Flowering & Fruiting: November-April.

Siddiqui 31050, Hardoi.

XCIV. EUPHORBIACEAE

Key to Genera:

Flowers petaliferous in one or both sexes:

Petals in both sexes; plants densely covered with stalked glandular hairs.....1. *Jatropha*

Petals absent in female flowers plant eglandular:

Erect or prostrate densely stellate pubescent herbs; seeds without caruncle .....2. *Chrozophora*

Erect herb with minute stellate hairs; seeds with creamy - white caruncles .....3. *Croton*

Flowers always monochlamydeceous:

Flowers in cyathia; involucre with glands .....4. *Euphorbia*

Flowers never in cyathia:

Leaves alternate, 3-5 nerved at base, crenate; female flowers with large peltate bracts; disk absent in both male and female flowers .....5. *Acalypha*

Leaves distichous, entire; flowers without peltate bract; disk

present in both male and female flowers ..... 6. *Phyllanthus*

1. Jatropha Linn.

Jatropha gossypifolia Linn. Sp. Pl. 1006, 1753; FBI. 5:383, 1887; HFDD. 461, 1977.

A dark-purple tinged shrub. **Leaves** ovate with a cordate base, divided less than half way down, 3-5 palmatifid; margins ciliate with stalked glands. **Flowers** in terminal, corymbose cymes, monoecious, 5-merous. **Sepals** 5, glandular along the margins. **Petals** deep-red with prominent veins. **Stamens** 8-10, filaments connate at the base. **Fruit** 3-seeded capsule, trigonous. **Seeds** ellipsoid, dark-brown, carunculate.

Rarely found on the edges of orchards.

Flowering & Fruiting: June-December.

Siddiqui 31083, Lakhimpur Road.

2. Chrozophora Neck

Chrozophora prostrata Dalz. in Dalz. & Gibs. Bomb. Fl. 233, 1861; FUGP. 2:207, Repr. ed. 1960; FPP. 234, 1978.

A prostrate herb, densely stellate tomentose; branches radially spreading, often reddish-brown. **Leaves** broadly ovate, elliptic. **Flowers** in axillary and terminal racemes. **Capsule** stellately woolly.

Not uncommon, occurs in dry ditches.

Flowering & Fruiting: March-July.

Siddiqui 31297, Jhala.

3. **Croton** Linn.

Croton bonplandianum Baillon, Adansonia 4:339, 1864; HFDD. 456, 1977.

Croton sparsiflorum Morong, Ann. N. Y. Acad. Sci. 7:221, 1893.

An erect profusely branched herb, with a strong smell; younger parts with scurffy deposition, branches stellate hairy. **Leaves** ovate-lanceolate, acute, serrate, petioled. **Flowers** in terminal racemes; female near the base and male towards the apex. **Male flowers** solitary, subsessile, with 2-prominent disk shaped glands at the base of pedicel; ovary 3-celled, stellately pubescent; style 3, bifurcating into 6 stigmas. **Seeds** dark-brown, oblong, carunculate.

Abundant in waste-lands, along road sides and railway tracks.

Flowering & Fruiting: May-December.

Siddiqui 31364, Pokher.

4. **Euphorbia** Linn.

Key to species:

Stem very short or absent. Leaves in a basal rosette ..... 1. *E. fusiformis*

Stem well-developed. Leaves not in a basal rosette:

Erect herbs or shrubs:

Leaves alternate below; opposite or whorled above:

Involucre with 4-glands,

semilunate, locinate and yellowish-green .....2. *E. dracunculoides*

Involucre with a single gland, cupular with orbicularly excavate apex & yellow-coloured .....3. *E. geniculata*

Leaves all opposite:

More or less glabrous plants; involucral glands with petaloid appendages.....4. *E. hypericifolia*

Plants with long hispid hairs; involucral glands without petaloid appendages or sometimes with a narrow limb .....5. *E. hirta*

Prostrate herbs:

Capsule hairy:

Cocci pubescent all along surface; seeds faintly wrinkled .....6. *E. thymifolia*

Cocci pubescent on keel only; seeds deeply wrinkled .....7. *E. prostrata*

Capsule glabrous; leaves ovate-oblong to rounded; seeds smooth .....8. *E. orbiculata*

1. **Euphorbia fusiformis** Buch. -Ham. ex D. Don, Prodr. 62, 1825; FBI. 5:257, 1886; HFDD. 457, 1977.

Euphorbia acaulis Roxb. (Hort. Beng. 36, 1814, nom. nud.) Fl. Ind. ed. Carey 2:472, 1832; FUGP. 2:182, Repr. ed. 1960.

A dwarf herb. **Stem** reduced to a stout, underground rootstock. **Leaves** all redical, subsessile, **fleshy, ovate or oblanceolate**, with a cuneate base, subacute or rounded **apex. Involucres** greenish yellow, subsessile, hemispheric, lobes spathulate, fimbriate. **Heads** in long peduncled dichotomously branched cymes, which are crowded at the apex of the roostock and appear before the leaves. **Capsule** glabrous. **Cocci** compressed; **style** 3, combined to the middle. **Seeds** broadly ovoid, smooth.

Usually found in the burnt area.

Flowering: March-May; **Fruiting:** August-September.

Siddiqui 31346, Chhatouri.

2. **Euphorbia dracunculoides** Lamk. Encycl. 2:428, 1788; FBI. 5:262, 1887; FUGP. 2:185, Repr. ed. 1960; HFDD. 457, 1977; FPP. 236, 1978.

An erect, repeatedly dichotomously branched, glabrous herb. **Leaves** linear-lanceolate. **Cyathia** in between forks, mostly solitary, involucral glands 4, semilunate, laciniate, yellow, involucre campanulate, glabrous without, hairy within. **Capsule** smooth. **Seeds** oblong, dark-brown, leprose tuberculate.

Not common. A weed of wheat and barley fields.

Flowering & Fruiting: December-June.

Siddiqui 31397, Bhura tikku.

3. **Euphorbia geniculata** Orteg. Nov. Rar. Pl. Hort. Matr. Decad. 18, 1797; Sherff, Ann. Miss. Bot. Gard. 25:72, 1937; HFDD. 459, 1977.

Euphorbia prunifolia Jacq. Hort. Schoenbr. 3:15, 1798; FUGP. 2:190, Repr. ed. 1960; Backer & Bakh. f. Fl. Java 2:502, 1965.

An erect herb, with bluish latex. **Stem** fistular, ribbed, branched in the upper part, glabrous or thinly long-hairy towards the apex. **Leaves** variable, linear-lanceolate to oblong or ovate-elliptic to obovate-pandurate, with a rounded, narrowed base, obtuse or acute, subentire-dentate to serrate glabrous or hairy. **Cyathia** on repeatedly forked branches in corymbose cymes. **Involucral** gland solitary, cupular with an orbicularly exavated apex, yellow often filled with viscid juice. **Seeds** dark-brown, tuberculate.

Abundant in moist and shady places.

Flowering: July-November; **Fruiting:** August-December.

Siddiqui 31534, Saktapur.

4. **Euphorbia hypericifolia** Linn. Sp. Pl. 454, 1753; Sherff. Ann. Miss. Bot. Gard. 25:60, 1937; Wheeler, Rhodora 62:134-141, 1960; HFDD. 459, 1977.

Euphorbia parviflora Linn. Syst. Nat. ed. 10. 1047, 1759.

Chamaesyce hypericifolia (Linn.) Millsp. Field. Mus. Nat. Hist. Bot. Ser. 2:302, 1909; Hurusawa Journ. Fac. Sci. Univ. Tokyo Bot. 6:285, 1954.

An erect or decumbent herb. **Stem** often tinged with reddish-

purple. **Leaves** opposite, elliptic-oblong, obliquely subcordate at the base; serrate, obtuse to acute, **glabrous** above, appressed hairy beneath. **Cyathia** in axillary, dense, peduncled clusters. **Involucral glands** orange-yellow with petaloid appendages. **Capsule** nearly glabrous. **Seeds** quadrangular-ovoid, transversely ribbed.

Abundant, mainly found in sugarcane fields.

Flowering & Fruiting: August-December.

Siddiqui 31398, Bhura tikku.

5. **Euphorbia hirta** Linn. Sp. Pl. 454, 1753; FUGP. 2:187, Repr. ed. 1960; Farwell, Rhodora 38:332, 1936; Sherff, Ann. Miss. Bot. Gard. 25:64, 1937; Wheeler Contrib. Gray Herb. 127:276, 1939; HFDD. 458, 1977.

Euphorbia pilulifera auct. pl. (non Linn. 1753); FBI. 5:250, 1887.

Chamaesyce hirta (Linn.) Millsp. Field Mus. Nat. Hist. Bot. Ser. 2:303, 1909; Hurusawa Journ. Fac. Sci. Univ. Tokyo Bot. 6:277, 1954.

A prostrate or ascending annual herb. **Stem** hairy, hairs of two types one spreading and red-purple in colour, the other appressed and yellow-white. **Leaves** oblong, sparsely hairy, often with a reddish-brown spot above. **Cyathia** in axillary cymes. **Involucral** glands minute, 4-5 in number, flat topped, limb very small or obsolete. **Capsule** appressedly pubescent. **Seeds** quadrangular-oblong, minutely ribbed, reddish-brwon.

Abundant, found on road sides, waste land, agricultural fields

and old walls.

Ethnobotanical uses:

The plant is used in worms, bowel complaints, cough, gonorrhoea and local application for the cure of ringworm.

Flowering & Fruiting: Nearly round the year.

Local Name: 'Dudhi'

Siddiqui 31001, Hardoi.

6. **Euphorbia thymifolia** Linn. Sp. Pl. 454, 1753; FBI. 5:252, 1887; FUGP. 2:188, Repr. ed. 1960; FPP. 238, 1978.

A prostrate annual herb, more or less hispidly hairy. The whole plant often with a pale coppery tinge. **Leaves** small opposite, obliquely oblong or elliptic-oblong, glabrous above, sparsely pilose beneath. **Cyathia** axillary, solitary or 2-3 together; glands minute, red, limb none, interglandular space hairy. **Capsule** obtusely keeled; keel hairy. **Seeds** quadrangular, bluntly pointed and with 5-6 transverse shallow furrows.

A very common weed.

Ethnobotanical uses:

The juice of the plant is applied externally to the bitten portion of snake and other poisonous reptiles. The whole plant is also used in gonorrhoea, bowel affections, ringworm and dandruff.

Flowering & Fruiting: July-November.

Local Name: 'Chhoti-dudhi'

Siddiqui 31016, Hasia.

7. **Euphorbia prostrata** W. Ait. Hort. Kew 2:139, 1739; FBI. 5:266, 1887; Sherff, Ann. Miss. Bot. Gard. 25:69, 1937; HFDD. 460, 1977.

Euphorbia chamaesyce Linn. Sp. Pl. 455, 1753; Willd. Weeds & Aliens in Africa 17, 1968; Shah-Yogi in Journ. Nat. Bot. Hist. Soc. 69(2):448, 1972.

Chamaesyce prostrata (W. Ait.) Small, Fl. South-East. U. S. 713, 1903; Hurusawa in Journ. Fac. Sci. Univ. Tokyo, Bot. 6:287, f. 37, 1954.

A small prostrate, slender annual herb, with hispidly hairy branches, often one side purple. **Leaves** opposite, obliquely oblong, minutely serrate towards the tip, 3-nerved, often prominent. **Stipules** fimbricate. **Cyathia** axillary, pinkish, glands red, suborbicular with a narrow **appendage. Capsule** 1-1.2 mm across, cocci distinctly keeled with stiff spreading hairs on it. **Seeds** 4-angled, brown, transversely furrowed.

Commonly found in newly cultivated fields near the forest edges.

Flowering & Fruiting: Major part of the year.
Siddiqui 3103, Hasia.

8. **Euphorbia orbiculata** HBK. Nov. Gen. et. Sp. 2:52, 1817; vide Rajgopal & Panigrahi in Taxon 17(5):547, 1968; Backer & Bakh. f. in Fl. Java 1:503, 1963 & 3:649, 1968.

Euphorbia bambaiensis Santapau in Bull. Bot. Soc. Beng. 8:17, 1955.

Eurphobia microphylla Heyne ex Roth. Nov. Pl. Sp. 229, 1821; FBI. 5:252, 1887; FUGP. 2:188, Repr. ed. 1960.

A glabrous annual or perennial herb, branches spreading from the root and dichotomously branched. **Leaves** opposite, coriaceous, obliquely oblong, rounded oblong or subquadrate, rounded truncate or retused at the apex, mucronulate, obscurely denticulate only at the broad end, margins often **pink. Stipules** minute, triangular; distinct on the upper side; united, 2-partite on the lower side, deeply lacinate. **Cyathia** solitary axillary. **Involucral** glands minute. **Capsule** glabrous, cocci keeled; style short, deeply 2-fid. **Seeds** obtusely 4-angled, ovoid, pale-brown, smooth gelatinous if moistened.

Commonly found along river sides.

Flowering & Fruiting: Nearly round the year.

Siddiqui 31Ø45, Bhaseta river.

Following species of *Euphorbia* are often cultivated in gardens and parks.

1. Euphorbia millii Ch. -des Moulins in Bull. Hist. Nat. Soc. Linn. Bordeaux 1:27-3Ø, Pl. 1. 1826; FPP. 237, 1978.

Euphorbia splendens Boj. ex Hook. in Bot. Mag. t. 29Ø2, 1829; FUGp. 2:189, Repr. ed. 196Ø.

A much spreading spiny shrub. **Stem** obtusangular-ribbed, covered with long sharp prickles. **Leaves** oblong-ovate, mucronate at apex. **Cyathia** 2-8 on forked cymes. **Involucral** bracts bright red.

Cultivated on rockeries and gardens.

Flowering: Almost round the year; **Fruiting:** No fruits setting.

2. Euphorbia pulcherrima Willd. ex Klotz. in otto & Dietr. Allgem. Garten. 2:27, 1834; Bailey Man. Cult. Pl. 618, 1949; FUGP. 2:189, Repr. ed. 1960; FPP. 238, 1978.

A large shrub with many stems from the base, older parts of the stem yellowish-brown with prominent leaf scars. Leaves ovate-elliptic, entire or sinuate toothed or lobed; bracts leaf like, mostly red but may be pink or white depending on the variety. Involucral yellowish-green, gland orange-yellow, apex fissure like.

Cultivated in gardens.

Flowering & Fruiting: Decemebr-March.

3. Euphorbia antiquorum Linn. Sp. Pl. 450, 1753; Roxb. Fl. Ind. 2:468; Ind. Tr. 558, Repr. ed. 1971; FBI. 5:255, 1887; FUGP. 2:183, Repr. ed. 1960.

A large dark green shrub, with milky latex; branches 3-angled (winged) the wings sinuately repand-crenate; spines paired at each protuberance of the wing. Leaves small, nearly orbicular, caducous.

Cultivated in gardens as an ornamental and on the edges of gardens as an effective fencing.

Ethnobotanical uses:

The latex of the plant is acrid; it is a household local application for warts, skin diseases, painful joints, rheumatism, maggot, infested wounds and snake bite portion. The latex is also used with gram flour in case of gonorrhoea.

Flowering: April-March.

Local Name: 'Sehund'

4. Euphorbia neriifolia Linn. Sp. Pl. 451, 1753; FUGP. 2:184, Repr. ed. 1960; FPP. 237, 1978.

Easily distinguishable from the above species by pale-green colour, cylindric branches; spirally arranged spines and the leaves with are larger clustered towards the end of branches, fleshy and ovate-oblong.

Commonly planted as an ornamental and for fencing.

Ethnobotanical uses:

The latex is used in ophthalmia; a mixture of the latex and butter is applied over scabies and ulcers. An ointment made of the latex and termeric is used over piles.

Flowering: February-April.

Local Name: 'Sehund'

5 Euphorbia tirucalli Linn. Sp. Pl. 452, 1753; FBI. 5:254, 1887; FUGP. 2:189, Repr. ed. 1960; FPP. 238, 1978 (*thrucalli*).

A large shrub or small tree; branches fragile, herbaceous, fleshy, cylindric. Leaves linear-lanceolate, fleshy caducous.

Cultivated in gardens.

Flowering: No flowering has so far been observed within the area.

5 Acalypha Linn.

Acalypha indica Linn. Sp. Pl. 1003, 1753; FBI. 5:416, 1887; FUGP. 2:208. Repr. ed. 1960; FPP. 233, 1978.

An erect branched herb. **Stem** striate, hairy. **Leaves** long petioled, ovate rhomboid, cuniate, shallowly serrulate. **Flowers** in axillary and terminal spikes, often terminated by an abnormal T-shaped flowers. **Male folwers** in the upper portion of the spikes. **Stamens** 5-3, free. **Female flowers** in the lower portion of the spikes, subtended by well developed multifid into filiform segments. **Seeds** ovoid, light-brown, finely reticulate, carunculate.

Occassionally found in the moist and shady conditions.

Flowering & Fruiting: September-April.

Siddiqui 31500, Sadai behta.

6. **Phyllanthus** Linn.

Key to species:

Branches ascending from the base suffused with red; stipule ovate triangular; seeds transversely ribbed on the back .....1. *P. urinaria*

Branching not from the base; plant green; stipule lanceolate,subulate; seeds longitudinally ribbed on the back .....2. *P. fraternus*

1. **Phyllanthus urinaria** Linn. Sp. Pl. 982, 1753; FBI. 5:293, 1887; FUGP. 2:200, Repr. ed. 1960; Webster Journ. Arn. Arb. 38:194, 1958; HFDD. 463, 1977.

An erect or ascending herb, branched from the base. **Stem** suffused with red, branches 3-gonous, margined. **Leaves** petioled, oblong, obovate; base cuneate-rounded and slightly oblique, purple along

the margins. **Male flowers** 1-3 in leaf axils. **Stamens** 3. **Female flowers** solitary in the leaf axils. **Fruit** densely warty. **Seeds** brown, transversely ribbed on the back.

Common in fields and particularly moist and shady localities.

Flowering & Fruiting: August-October.

Siddiqui 31535, Sakatapur.

2. **Phyllanthus fraternus** Webster, Contrib. Gray Herb. 176:53, 1955; Journ. Arn. Arb. 38:309, 1957; HFDD. 462, 1977.

Phyllanthus niruri auct. pl. (non Linn. 1753); FBI. 5:298, 1887; FUGP. 2:210, Repr. ed. 1960.

Easily distinguishable from the above species by its green colour, branches which are not basal but cauline and the seeds which are longitudinally ribbed on the back.

Abundant in cultivated fields.

Flowering & Fruiting: July-Decemebr.

Siddiqui 31399, Bhura tikku.

The following plants are often cultivated within the area.

1. **Jatropha panduraefolia** Andr. Bot. Rep. 4:t. 267, 1799; Fl. Delhi 314, 1963.

Jatropha hastata Jacq. Enum. Pl. Carib. 32, 1760.

A medium sized shrub. **Leaves** undivided, dentate near the base, the base slightly hastate. **Flowers** in corymbose cymes, 5-merous, red. **Fruit** shallowly lobed with 3 cocci.

Planted in shrubberies.

Flowering & Fruting: April-November.

2. **Acalypha wilkesiana** Muell. -Arg. in DC. Prodr. 15(2):817, 1866; Man. Cult. Pl. 622, 1949; Fl. Delhi 317, 1963.

Acalypha tricolor Seem. Fl. Vit. 225, 1867.

A much branched dense shrub. **Leaves** elliptic, ovate, shortly acuminate, rounded at the base, variously mottled with shed of red; the plant turns brick-red in cold season. **Spikes** slender, reddish.

Cultivated in gardens for its attractive foliage.

Flowering: January-July.

3. **Ricinus communis** Linn. Sp. Pl. 1007, 1753; FBI. 5:457. 1887; FPP. 240, 1978.

A large shrub or small tree, erect, pruinose. **Leaves** peltate, palmatifid; segments serrate, crenate, petiole usually with two discoid glands. **Flowers** in terminal panicles consisting of cymes; basal flowers female, higher ones male. **Perianth** lobe 4-5. **Stamens** numerous, in many branched fascicles. **Ovary** 3-celled, muricate. **Seeds** ellipsoid, carunculate.

Cultivated, often found as an escape near the villages growing on the heaps of manure.

Ethnobotanical uses:

Decoction of leaves is a purgative, lactagogue and emmenogogue. A poultice of leaves is applied to boils and swellings; coated with some bland oils (preferebly mustard oil) the hot leaves are applied over the breast of nursing mothers as a lactagogue and over the inflammed breast during lactation to smooth mammary

glands. The oil of the seeds is medicinally most important, it is usually given in constipation during pregnancy, enteritis, dysentery, spasmodic diseases of the bowels, inflammatory disorders of the urogenital organs, gonorrhoea, amenorrhoea, asthma, dropsy and also used in various skin diseases.

Flowering & Fruiting: Almost round the year.

Local Name: 'Arand' or 'Arandi'

4. Putranjiva roxburghii* Wall. Tent. Fl. Nepal 61, 1826; FBI. 5:336, 1887; FUGP. 2:202, Repr. ed. 1960; Ind. Tr. 566, Repr. ed. 1971; FPP. 240, 1978.

A medium sized tree and glaucous. **Branches** drooping. **Leaves** oblong-ovate or lanceolate, margins serrate undulate. **Male flowers** in axillary clusters, very shortly pedicelled. **Sepals** 3-5 obtuse, siliate. **Stamens** 3; filaments connate at the base. **Pistillode** none. **Female flowers** solitary or 2-3 together. **Ovary** 2-3 celled, tomentose. **Stigma** crescent shaped. **Fruit** ovoid drupe, densely puberulous. **Seeds** hard, sharply pointed.

Commonly planted in the parks.

Flowering & Fruiting: March-February.

Siddiqui 31952, Hardoi.

* Some authors treat this taxon as a species of *Drypetes* and then it is named as *Drypetes roxbourghii* (Will.) Hurusawa.

5. Emblica officinalis Gaertn. Fruct. 2:122, 1790; Santapau in Rec. Bot Surv. Ind. 16(1):277, 1953; FPP. 235, 1978.

Phyllanthus emblica Linn. Sp. Pl. 982, 1753; FBI. 5:289, 1887.

A medium sized deciduous tree. **Bark** pale brown exfoliating into irregular flaks. **Leaves** linear-oblong, mucronate, light-green, connate to form a column; anthers apiculate. **Female flowers** subsessile. **Fruits** pale-green with ashy-white markins, depressed globose. **Seeds** plano-convex or asymatrically trigonous, dark-brown.

Abundent, usually planted on the fences of the gardens.

Ethnobotanical uses:

The most usefull part of the plant is fruit. The fruit is refrigerent, tonic, anti-scorbutic, diuretic and laxative. Dried fruit is given in diarrhoea, dysentery and haemorrhage. An infusion of seeds is used in fever, diabetes, bilious affections and nausea.

Flowering & Fruiting: March-December.

Local Name: 'Amla'

Siddiqui 31958, Shaheed Udhyan.

XCV. URTICACEAE

Pouzolzia Gaud.

Key to species:

Glabrous herb; fruits winged.....1. *P. pentandra*

Strigose herbs, stipules often with
long apical cilia;fruits not winged.....2. *P. zeylanica*

1. Pouzolzia pentandra (Roxb.) Benn. Fl. Java 64, 1883; FBI. 5:583, 1888; FUGP. 2:227, Repr. ed. 1960; HFDD. 471, 1977.

Urtica pentandra Roxb. Fl. Ind. ed. Carey 3:583, 1832.

Memorialis pentandra (Roxb.) Wedd. in DC. Prodr. 16:235, 1869.

Gonostegia pentandra (Roxb.) Miq. Ann. Mus. Bot. Lugd. -Bat. 4:302, 1870 (1869).

A perennial, marshy herb, branching from the base. **Stem** red, somewhat angular with appressed, scattered hairs. **Leaves** variable in shape, linear-lanceolate or ovate-lanceolate, acute, punctate above; stipules triangular-deltoid. **Male flowers** shortly pedicelled. **Perianth** lobes 5, cup-shaped, hooked hairy. **Stamens** 5, antitepalous; filament incurved in bud. **Female flowers** sessile; perianth lobes 2, tubular, accrescent. **Fruit** with 3 wings, two larger in the same plain the third at right angle to them and smaller. **Seeds** black, shining, ovate and with an acute apex.

Flowering & Fruiting: Nearly throughout the year.

Siddiqui 31400, Bhura tikku.

Plant associated: *Cyperus difformis, Eleocharis palustris, Bacopa monnieri, Sagittaria segittifolia.*

2. **Pouzolzia zeylanica** (Linn.) Benn. Pl. Javan. Rar. 67, 1838; Santapau Rec. Bot. Surv. Ind. ed. 3. 16:225, 1967; HFDD. 472, 1977.

Parietaria zeylanica Linn. Sp. Pl. 1052, 1753.

Pouzolzia indica (Linn.) Guad. Freye. Voy. Bot. 503, 1830; FBI. 5:588, 1888; FUGP. 2:226, Repr. ed. 1960.

An erect or ascending herb. Stem purple tinged, grooved, strigose. Leaves petioled, entire, acute or acuminate, opposite or alternate; nerves obscure adaxially but distinct abaxially, basal nerves three and one pair in the middle; stipules acuminate and usually with 2-3 long, apical cilia. Fruits ribbed, reddish, strigose. Seeds ovate, pointed at one end, smooth, shining, cream coloured.

Not common within the area while Duthie described this taxon as abundant.

Flowering & Fruiting: Rainy season.

Siddiqui 31536, Saktapur.

XCVI. MORACEAE

Key to Genera:

Flowers aggregated in globose heads or enclosed within fleshy receptacle:

- Flowers crowded on spicate to globose receptacle; male flowers with solitary stamens ..... 1. *Artocarpus*
- Flowers enclosed within fleshy receptacle; male flowers with 1-3 stamens ..... 2. *Ficus*

Flowers not aggregated in globose heads or inside fleshy receptacle:

- Male and female in catkin - like spikes; fruit an aggregate of achenes (Sorosis) ..... 3. *Morus*
- Male flowers three-five, spicate or racemose; female solitary or 2-3 together, fruit a drupe ..... 4. *Streblus*

1. **Artocarpus** J. R. & G. Forst., nom. cons.

Key to species:

Fruit of the size of an apple, valvety, lobulate, soft and yellow-orange ..... 1. *A. lakoocha*

Fruit very large tubercled ..... 2. *A. heterophyllus*

1. **Artocarpus lakoocha** Roxb. Fl. Ind. 3:524, 1832; FBI. 5:543,

1888; FUGP. 2:234, Repr. ed. 1960.

A large deciduous tree. Crown large. Bark reddish-brown, exfoliating in woody plates. Leaves coriaceous, lareg, elliptic or broadly oblong, short acuminate, scabrous above, softy pubescent beneath. Flowers in axillary short peduncled heads. Male heads orange-yellow with monandrous flowers; perianth lobes 2-3, truncate. Female heads gree. Fruits lobulate, valvety, orange-red when ripe; pulp sweet or acid.

Cultivated for the sake of fruits.

Flowering: March-June; Fruiting: August-September.

Local Name: 'Barhal'

Siddiqui 31191, Khera.

2. Artocarpus heterophyllus Lamk. Encycl. 3:210, 1789; Bailey Man. Cult. Pl. 388, 1949; Jerret in Journ. Arn. Arb. 40:334, 1959; FPP. 242, 1978.

Artocarpus integrifolia auct. non. Linn. f.

Differs from the preceding species in having leaves relatively smaller, pellucid punctate abaxially as well as adaxially. Development of the flowers from the main trunk and also older branches. Fruit quite large and tubercled.

Cultivated for the sake of fruits.

Flowering & Fruiting: February-November.

Siddiqui 31537, Saktapur.

2. Ficus Linn.

Key to species:

Leaves alternate:

Receptacles sessile, axillary:

Leaves ovate elliptic, obtuse; aerial roots numerous, becoming columneral length .....1. *F. benghalensis*

Leaves orbicular-ovate, abruptly long acuminate, receptacle subglobose, depressed at apex, dark purple at maturity .....2. *F. religiosa*

Receptacles stalked, axillary:

Medium - sized trees; leaves entire, oblong-ovate, more or less glabrous; receptacles globose; creamy - white with brown dots .....3. *F. virens*

Large shrubs or small trees; leaves toothed or 3 - 5 lobed, densely strigose pubescent; receptacles subglobose, pyriform, dark purple at maturity.....4. *F. palmata*

Receptacles stalked, not axillary but on special leafless branches from main trunk or old branches .....5. *F. racemosa*

Leaves opposite:

Receptacles on special branches as well as axillary; leaves and branches densely scabrid tomentose .....6. *F. hispida*

1. **Ficus benghalensis** Linn. SP. Pl. 1059, 1753; Miq. Hook. Lond. Journ. Bot. 6:571, 572, 1847; King Ann. R. Bot. Gard. Calc. 1:18, 19, 1887; FBI. 5:499, 1888; FUGP. 2:238, Repr. ed. 1960; FPP. 243, 1978.

Ficus indica Linn. Sp. Pl. 1060, 1753; emend. Lamk. Encycl. Bot. 2. Pl. 2:494, 1788.

Ficus cotoneaefolia Vahl Enum. Pl. 2:189, 1806.

A large evergreen, branches with aerial roots, which ultimately reach the ground. **Bark** smooth, grey. **Leaves** alternate, ovate-orbicular, coriaceous, entire; younger leaves pubescent; older leaves pubescent on the nerves beneath. **Receptacle** sessile in axillary pairs; red when ripe. **Male perianth** 4-lobed. **Stamen** 1.

Commonly planted as a shade tree.

Ethnobotanical uses:

Infusion of the young buds is given in diarrhoea and dysentery. The bark is as asteringent used in diabetes and leucorrhoea. The latex of the plant is used in rheumatism, sores, ulcers, pains and toothache.

Flowering & Fruiting: May-July.

Local Name: 'Bargad'

Siddiqui 31323, Hardoi.

2. Ficus religiosa Linn. Sp. Pl. 1059, 1753; FBI. 5:513, 1888; FUGP. 2:241, Repr. ed. 1960; FPP. 244, 1978.

Urostigma religiosum Casp. Ric. Caprif. 82. t. 7. ff. 1-5, 1845.

A large tree with canopy not very dense. **Bark** grey to dark-brown. **Crown** hemispheric or broadly conical. **Aerial roots** none. **Leaves** cordate, petioled, glabrous, apex long caudate, margins undulate. **Receptacles** sessile, axillary paired, smooth, depressed-globose. **Male flowers** ostioler, perianth 2-3 lobed. **Female flowers** perianth 4-5 lobed; style lateral glabrous. **Gall flowers** pedicels, numerous; perianth none. **Ripe receptacles** dark-purple.

Commonly found in vicinity of the temples.

Ethnobotanical uses:

The bark is astringent used in gonorrhoea, scabies, inflammatory swellings, toothache. The powdered root bark dusted over sores and paste applied to the sores of children. The fruit is digestive and laxative their powder is given in asthma.

Flowering & Fruiting: April-June.

Local Name: 'Peepal'

Siddiqui 31322, Hardoi.

3. Ficus virens Ait. Hort. Kew 3:451, 1789; Corner in Gdns. Bull. Singapore 17:376, 1960.

Ficus infectoria sensu Roxb. FL. Ind. 3:551, 1832; FBI. 5:515, 1888; FUGP. 2:243, Repr. ed. 1960.

Urostigma infectorium Miq. Zool. Syst. Verz. 90, 1854.

Ficus infectorium (Miq.) Miq. Ann. Mus. Bot. Lugd. Bat. 2:264,

1867; King, Ann. R. Bot. Gard. Calc. 6Ø. pl. 75, 1887.

A tall tree with a large canopy area. **Bark** grey, smooth. **Crown** hemispheric, spreading. **Aerial roots** few from the trunk or branches. **Leaves** glabrous, petioled, oblong-lanceolate, apex abruptly short acuminate, margins slightly undulate. **Receptacles** sessile, axillary paired, pubescent. **Male flowers** sessile, perianth 4-lobed, filament short, anthers ovate. **Female flowers** perianth as in male flowers; style short; very compressed. **Gall flowers** numerous, stalked. **Ripe receptacles** creamy-white with pink dots.

Commonly planted on road sides for shade and in villages near Choupals.

Ethnobotanical use:

Dried powder of the fruit is given in diabetes.

Flowering & Fruiting: April-June.

Local Name: 'Pakhar' or 'Pakaria'

Siddiqui 31349, Chandra Devi Shiksha Niketan.

4. Ficus Palmata Forsk. Fl. Aegypt. -Arb. 179, 1775; FBI. 5:53Ø, 1888; FUGP. 2:247, Repr. ed. 196Ø; FPP. 245, 1978.

A large shrub with spreading branches. **Leaves** alternate, hispid-hairy, ovate-cordate or obtusely 3-5 angled, crenate-dentate. **Receptacles** peduncled, solitary, axillary, pubescent, pyriform. **Male flowers** pedicelled, pedicle hairy; perianth 4-5 lobes, hairy. **Stamens** usually 4, filaments hairy. **Female flowers and Gall flowers** mixed. **Ovary** obliquely ovoid. **Style** short, lateral

stigma compressed.

Often found in waste lands and near the water channels.

Flowering & Fruiting: May-December.

Siddiqui 31538, Saktapur.

5. Ficus racemosa Linn. Sp. Pl. 1060, 1753; Corner in Dansk. Bot. Arkiv. 23:28, 1963; FPP. 243, 1978.

Ficus glomerata Roxb. Pl. Cor. 2:13, t. 123, 1798; FBI. 5:535, 1888; FUGP. 2:248, Repr. ed. 1960.

Ficus goolereea Roxb. Fl. Ind. 3:538, 1832.

Covellia glomerata Miq. in Hook. Lond. Journ. Bot. 7:465, 1848.

A tall tree. **Bark** smooth, reddish-brown. **Stem** usually buttressed, young parts pubescent. **Leaves** alternate, petioled, ovate, oblong, acute, subacute, entire, slightly pubescent beneath and glabrous above when fully mature. **Receptacles** on especial thick, penicled branches. **Male flowers** sessile, ostioler; perianth 3-4 lobed. **Stamens** 2, rudimentry carpel present. **Female flowers** subsessile or sessile, numerous; perianth lobes 4-5, reddish-brown, style deep pink. **Gall flowers** pedicelate. **Ripe receptacles** reddish-brown.

Commonly cultivated.

Ethnobotanical uses:

An infusion of the leaves being astringent, is given in dysentery, menorrhagia and haemoptysis and usefull in mouth wash for spongy gums. Bark is also given in dysentery and diabetes; its decoction is used to wash wounds. The latex of the plant is

used in mouth blisters, piles, diarrhoea, gonorrhoea and rheumatic joints.

Flowering & Fruiting: August-January.

Local Name: 'Goolar'

Siddiqui 31365, Collectrate.

6. Ficus hispida Linn. f. Suppl. 442, 1781; FBI. 5:522, 1888; FUGP. 2:244, Repr. ed. 1960; Ind. Tr. 606, Repr. ed. 1971.

Ficus oppositifolia Willd. Sp. Pl. 4:1151, 1805.

Govellia oppositifolia Gasp. Nov. Gen. Fic. 85, 1844.

Govellia daemonum Miq. in Hook. Lond. Journ. Bot. 7:462, 1848.

A large shrub or small tree, 4-10 m high. **Bark** horizontally wrinkled; branchlets hispid hairy. **Leaves** opposite, ovate-oblong, acuminate, entire to shallowly crenate, coriaceous, scabrid, densely, pellucid-dotted above. **Receptacles** clustered on leafless drooping branches, rarely axillary pairs, broadly pyriform-ovoid, hispid, pale-green, pale-yellow at length. **Male flowers** ostioler; perianth 3-4 lobed, basally connate, hyaline. **Stamens** 1; filaments short. **Female flowers** sessile or subsessile. **Perianth** lobes 3-4, connate, hyaline, dilated at base. **Ovary** compressed, globose, style lateral and hairy. **Gall flowers** pedicellate, perianth lobe none or rudimentry. **Drupes** compressed, ovoid.

Often found in scrub open forest.

Ethnobotanical uses:

Paste of the fruit is applied to buboes, which it either disperses or bring rapidly to maturity.

Flowering & Fruiting: March-December.

Local Name: 'Kath-gularia'

Siddiqui 31278, Mamapurva.

3. **Morus** Linn.

Morus macroura Miq. Pl. Jungn. 1:42, 1851.

Morus laevigata Wall. ex Hook. FBI. 5:492, 1888.

A medium sized tree. **Bark** light grey. **Branches** lanticellate, flexible and strong. **Leaves** broadly ovate, 3-5 lobed, rough on both surfaces, serrate. **Flowers dioecious emerged before the** leaves. **Male catkin** lax flowered, cylindric. **Stamens** 4; filaments incurved. **Female catkin** linear, pendullous; perianth 4-lobed, becoming juicy in fruit. **Ovary** compressed, style 2, unequal. **Fruits** a sorosis, juicy, green or purple, sweet.

Commonly cultivated for the sake of fruits.

FLowering & Fruiting: February-May.

Siddiqui 31259, Jhala.

4. **Streblus** Lour. emend. Corner

Streblus asper Lour. Fl. Cochinch. 2:615, 179Ø; FBI. 5:489, 1888; FUGP 2:232, Repr. ed. 196Ø; Ind. Tr. 615, Repr. ed. 1971.

An intricately branched shrub or small tree. **Bark** smooth, tough, grey, irregulary fissured; young twigs ferruginous, scabrous. **Leaves** alternate, rhomboid-elliptic or obovate, acute or acuminate, subcrinate, scabrid on both surfaces. **Flowers** dioecious. **Male flowers** in short, axillary, peduncled heads,

yellowish-green. **Female flowers** solitary axillary. **Perianth** 4-lobes, free or basally connate. **Stamens** 4; pistillode pyriform. **Ovary** 1.2-1.7 mm across, ovule solitary, pendullous. **Fruit** a globose drupe, loosely enveloped in accrescent sepals (perianth), pale yellow.

Fairly common in open scrub forest.

Flowering & Fruiting: January-July.

Siddiqui 31298, Jhala.

XCVII. ULMACEAE

Holoptelea Planch.

Holoptelea integrifolia (Roxb.) Planch. in Ann. Sci. Nat. (Ser. 3), 10:266, 1848; FBI. 5:481, 1888; FUGP. 2:217, Repr. ed. 1960; Fl. Delhi 321, 1963.

Ulmus integrifolia Roxb. Pl. Cor. 1:56, t. 78, 1798.

A medium sized to large deciduous tree. **Bark** grey. **Leaves** elliptic-ovate, acuminate, subcoriaceous. **Flowers** in numerous fascicles on the leafless branches. **Stamens** 8 in male flowers; 5 in bisexual ones; anthers 2-celled, pubescent. **Ovary** a suborbicular-oblong samara, distinctly notched at apex, broadly winged, wings reticulately veined.

Commonly planted on the road sides.

Ethnobotanical use:

Leaves of the plants are used in ringworm.

Flowering: March-April; **Fruiting:** May-June.

Local Name: 'Papri'

Siddiqui 31325, Hardoi.

XCVIII. CANNABACEAE

Cannabis Linn.

Cannabis sativa Linn. Sp. Pl. 1027, 1753; FBI. 5:487, 1888; FUGP. 2:220, Repr. ed. 1960; Backer, Fl. Males. Ser. 1. 4:223, 1951; HFDD. 474, 1977; FPP. 245, 1978.

Cannabis indica Lamk. Encycl. 1:695, 1783.

Erect much branched herb. **Leaves** 3-8 foliate; leaflets narrowly lanceolate, serrate, glandular pubescent. **Male flowers** perianth lobes basally connate, 5, greenish-yellow. **Stamens** 5, free, antiphyllous. **Female flowers** enclosed by prominent bracts, glandular pubescent. **Ovary** 1-celled; **style** 1; **stigma** usually unequally lobed.

Abundant in waste places and on road sides.

Flowering & Fruiting: December-May.

Siddiqui 31383, Lakhimpur Road.

XCIX. CASUARINACEAE

Casuarina Linn. ex Adans.

Casuarina equisetifolia Linn. ex J. R. & G. Forster. Char. Gen. Pl. 104. t. 52, 1776; Bullock in Kew Bull. 14:40, 1960; FBI. 5:598, 1888; FUGP. 2:250, Repr. ed. 1960; Fl. Delhi 330, 1963.

Casuarina muricata Roxb. Fl. Ind. 3:519, 1832.

A medium sized tree with a straight trunk and drooping branches. **Crown** conical, not very dense. **Leaves** minute, scaly, 6-9 (depending on the number of flowers on the branch). **Male flowers** in ovoid heads, flowers spirally arranged. **Ovary** 2-celled, ovules 2, style red, bifid. **Fruit** apically winged samara.

Planted in gardens.

Flowering & Fruiting: February-August.

Siddiqui 31263, Lucknow Road.

C. SALICACEAE

Salix Linn.

Salix tetrasperma Roxb. Pl. Cor. 1:66. t. 97, 1798; FBI. 526, 1888; FUGP. 2:253 Repr. ed. 1960; Santapau in Rec. Bot. Surv. Ind. 16(1):296, 1953; Fl. Delhi 330, 1963.

A small sized tree. **Branches** drooping and flexible. **Bark** grey, longitudinally fissured. **Leaves** simple, ovate-lanceolate, minutely serrate, green above, white beneath. **Flowers** unisexual, on different trees, in catkins, bracteate, fragrant. **Stamens** 4-8 (-10), unequal, filaments hairy. **Ovary** 1-celled, ovoid-oblong to conical. **Stigma** 2-lobed.

Found along the road sides but not frequent.

Flowering & Fruiting: September-March.

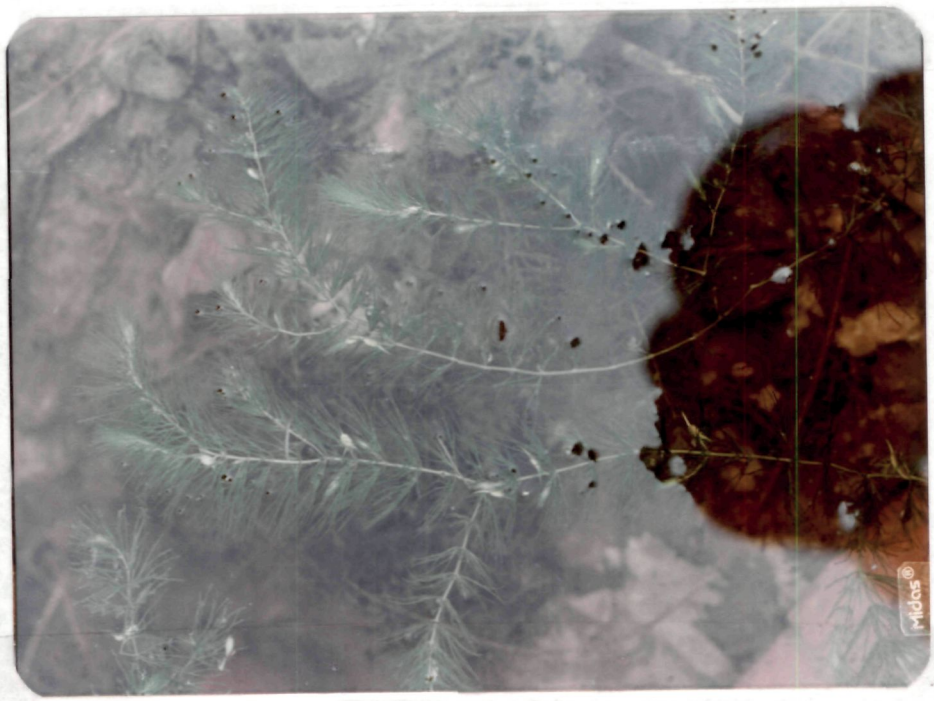
Siddiqui 31300, Shahabad Road.

Populus nigra Linn.

A large tree, branchlets. **Leaves** almost triangular, acuminate crenate; midrib penninerved. **Crown** pyramidal (rather cupressiform).

This species has been introduced only few years back. It is planted as an avenue tree. Never seen in flowering.

Flowering & Fruiting: Not seen.



Ceratophyllum demersum Linn.

Cl. CERATOPHYLLACEAE

Ceratophyllum Linn.

Ceratophyllum demersum Linn. Sp. Pl. 992, 1753; FBI. 539, 1888; FUGP. 2:255, Repr. ed. 1960; Fl. Delhi 331, 1963; HFDD. 474, 1977.

Ceratophyllum verticillatum Roxb. Fl. Ind. 3:624, 1832.

A branched, rough, submerged hydrophyte. **Leaves** whorled, usually 5-10 in a whorl, bifid near the apex, segments toothed (rendering the plant slightly rough). **Flowers** solitary-axillary, sessile. **Male flowers** with 10-15 perianth segments and 10-20 stamens. **Female flowers** perianth same as in male. **Ovary** sessile, 1-celled; style 1; Stigma 1, with a lateral pouch. **Fruit** a laterally compressed achene, with 2 soft spines near the base and persistent style.

Abundant in ditches, ponds and streams.

Flowering & Fruiting: September-February.

Siddiqui 3126Ø, Jhala.

CII. HYDROCHARITACEAE

Key to Genera:

Leaves radical or crowded near the base.

Leaves petioled, broadly ovate; flowers large, bisexual, pedicel not coiled .....1. *Ottelia*

Leaves sessile, ribbon-like; flowers minute, unisexual; female pedicelled pedicel coiled .....2. *Vallisneria*

Leaves cauline.

Leaves long, ribbon-like, narrow, alternate, margins undulate; female spathe sessile .....3. *Nechamandra*

Leaves short, whorled, margins not undulate; female spathe long pedunculed .....4. *Hydrilla*

1. Ottelia Linn.

Ottelia alismoides (Linn.) Pers. Syn. Pl. 1:400, 1805; FBI. 5:662; FUGP. 2:265, Repr. ed. 1960; Hartog. Fl. Males. Ser. 1. 5:398, 1957; HFDD. 476, 1977.

Stratiotes alismoides Linn. Sp. Pl. 535, 1753.

A submerged hydrophyte; upper leaves and ovate-lanceolate, while lower ones are smaller and shortly petioled, ovate, cordate at the base. Flowers white, bisexual, rising above the water

surface. Spathe glabrous, 5-winged. **Petals** plicate in the bud, obovate, rounded. **Stamens** 6-8; filaments hairy. **Seeds** oblong.

Abundant in ponds and ditches.

Ethnobotanical use:

Poultice of leaves in arms and legs during high fever.

Flowering & Fruiting: July-February.

Local Name: 'Jal-palaki'

Siddiqui 31201, Khera.

2. **Vallisneria** Linn.

Vallisneria spiralis Linn. Sp. Pl. 1015, 1753; FBI. 5:660, 1888; FUGP. 2:263, Repr. ed. 1960; HFDD. 476, 1977.

A grass-like, stoloniferous, rooted hydrophyte, size variable. **Leaves** linear, ribbon-like, flaccid. **Male flowers** minute, numerous, enclosed in an ovoid spathe. **Perianth** lobes 3. **Stamens** 1-3. **Female flowers** solitary, spathe tubular; pedicel long, coiled. **Carpels** 3. **Ovules** many on parietal placentae. **Stigmas** 3, subcapitate.

Abundant in ditches and ponds.

Flowering & Fruiting: September-March.

Siddiqui 31382, Baturi purva.

3. **Nechamandra** Planch.

Nechamandra alternifolia (Roxb.) Thwaites, Enum. Pl. Zeyl. 332, 1864; Aquat. Ang. 56, 1962; HFDD. 476, 1977.

Vallisneria alternifolia Roxb. Fl. Ind. ed. Carey 3:750, 1832.

Nechamandra roxburghii Planch. Ann. Sci. Nat. Paris 3. 11:78, 1849.

Lagarosiphon roxburghii (Planch.) Benth. Gen. Pl. 3:451, 1880; FBI. 5:659, 1888; FUGP. 2:262, Repr. ed. 1960.

A rooted, brownish, hydrophyte. **Leaves** alternate, sessile, oblong, lanceolate, margins undulate. **Male flowers** many in 2-fid spathe. **Stamens** 2. **Female flowers** spathe tubular, 2-fid. **Ovary** lanceolate. **Fruit** a utricle.

Fairly common in ponds.

Flowering & Fruiting: Rainy and winter seasons.

Siddiqui 31202, Khera.

4. **Hydrilla** Rich.

Hydrilla verticillata (Linn. f.) Royle, I 11. t. 376, 1839; FBI. 5:659, 1888; FUGP. 2:262, Repr. ed. 1960; HFDD. 475, 1977.

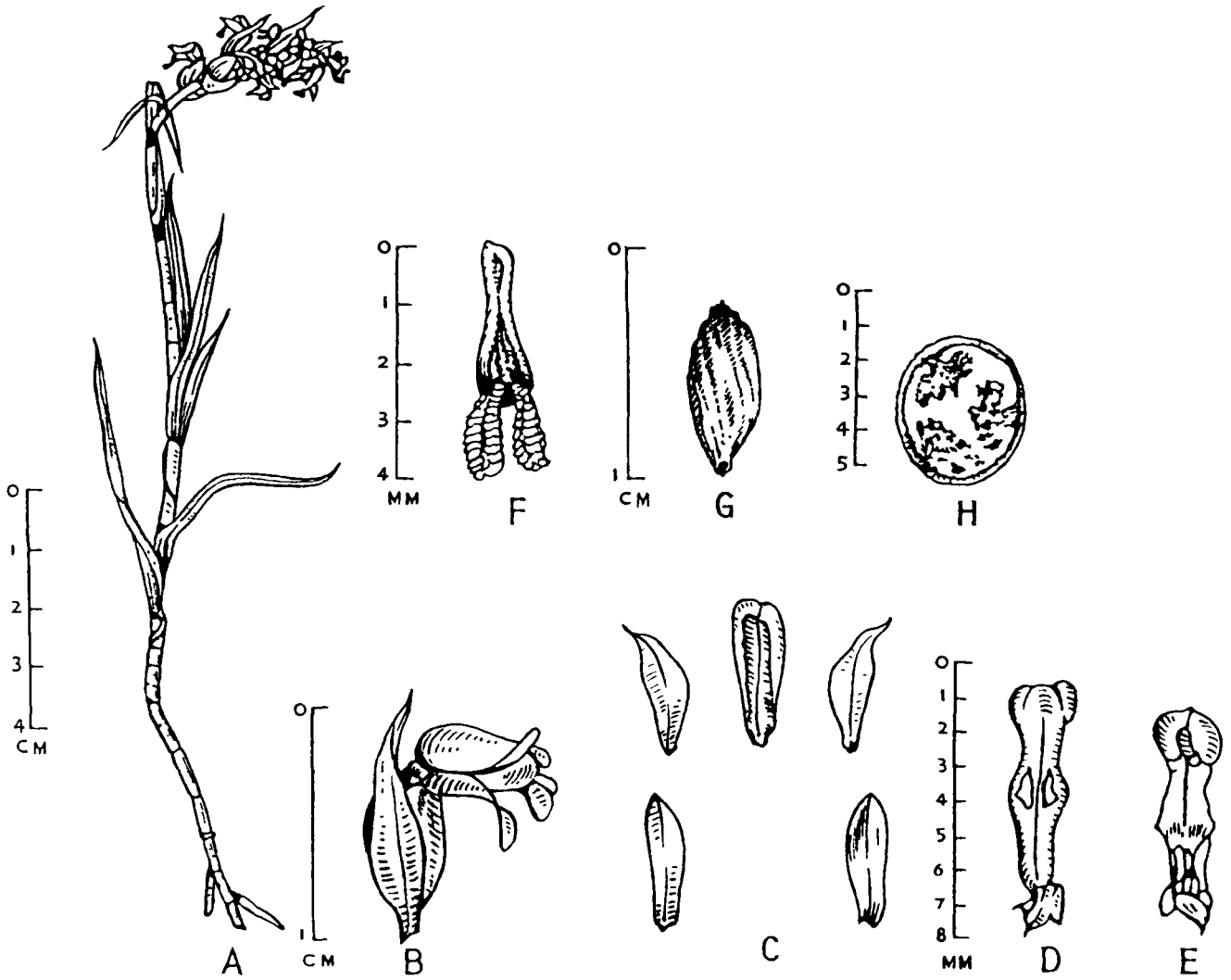
Serpicula verticillata Linn. f. Suppl. 416, 1781.

A dark green submerged, aquatic herb. **Leaves** whorled, 4-6 at a node, narrowly lanceolate, spreading, 1-nerved. **Male flowers** solitary-axillary. **Perianth** lobes 6. **Stamens** 3. **Female flowers** sessile, enveloped by cylindrical spathe; peduncle long. **Carpels** 3, connate. **Fruit** subulate, 2-3 seeded.

Abundant in ponds and ditches.

Flowering & Fruiting: August-January.

Siddiqui 31376, Hasia.



Zeuxine strateumatica (Linn.) Schltr.

CIII. ORCHIDACEAE

Zeuxine Lindl.

Zeuxine strateumatica (Linn.) Schlecht. in Fedde Repert. Beih. 1:77, 1911; Blatt. & McC. in Journ. Bomb. Nat. Hist. Soc. 35:731, 1932.

Orchis strateumatica Linn. Sp. Pl. 2:943, 1753.

Zeuxine sulcata Lindl. Gen. Sp. Orch. 485, 1840.

An erect, small, terrestrial herb. **Leaves** simple, alternate, linear, subfleshy. **Flowers** in slightly decurved spikes or racemes. **Bracts** exceeding the ovary. **Sepals** 3, unequal; 2 lateral ones linear-oblong, dorsal odd one, ovate-oblong. **Petals** 3, creamy-white, elliptic-oblong; the labellum (lip) 3.5-5 x 1.5 mm, saccate basally, panduriform, rostellum 4-5 mm long. **Stamen** 1; anther 2-celled, orange-red; pollinia 2, lamillate, pyriform; caudicle 1-1.5 cm long, terminating viscidia. **Carpels** 3, connate. **Ovary** oblong ovoid, 1-celled; ovules on 3-parietal placentas. **Fruit** a capsule, ellipsoid-ovoid, ribbed.

Common along the canal banks.

Flowering: January-April; **Fruiting:** April-June.

Siddiqui 31281, Bilgram Road.

CIV. MUSACEAE

Musa Linn.

Musa x **paradisiaca** Linn. Sp Pl. 1043, 1753. (*M. acuminata* x *M. balbisiana*; *M. paradisiaca*); Moore, Bailey, 5:185, 1957.

Musa x *sapientum* Linn. Syst. Nat. ed. 10. 1303, 1759. (*M. sapientum*).

A pseudostem tall, smooth, arising from the subterranian stem. Leaves long petioled, petiole channeled, lateral veins running nearly at right angle to the midrib. Flowers in drooping spikes; bracts oblong-lanceolate, deep red or dull-purple. Perianth 2-seriate, outer larger, yellowish-brown; inner ones membranous, nearly transparent. Stamens 6, rarely 5. Carpels 3, connate. Ovary 3-celled, inferior; style 1; stigma flattened. Fruit a berry, strongly angular.

Cultivated for the sake of fruits.

Ethnobotanical uses:

The root is used as an anthelmintic and in gonorrhoea. It is also given in veneral diseases, anemia and disorders of the blood. Juice of the flower is given with curd in dysmenorrhoea and menorrhagia; diabetes the cooked flowers are eaten. The ripe fruit mixed with a little tamarind and salt is used in early cases of diarrhoea and dysentery.

Flowering & Fruiting: March-October.

Local Name: 'Kela'

Siddiqui 32000, D.M. Lodge.

Ravenala medagascariensis Sonn. has been planted at some places. This can be readily made out by *Musa* like 2-ranked leaves, which give the plant a fan-like structure. This plant is known as traveller's joy tree within the area.

CV. ZINGIBERACEAE

This family has great economic importance. The following plants are often cultivated in some private kitchen gardens within the area.

1. Zingiber officinale Rosc. in Trans. Linn. Soc. Lond. 7:348, 1807; FBI. 6:246, 1892; FUGP. 2:310, Repr. ed. 1960; Schum. Pfreich. 20:170, 1904; Holttum, Gard. Bull. 13:54, 1950; HFDD. 504, 1977.

A rhizomatous perennial herb. **Leaves** simple, lanceolate, tapering at both ends, leaves sheath prominent, leaves and ligule glabrous.

Extensively cultivated in kitchen gardens for the sake of rhizome.

Ethnobotanical uses:

It has vast range of medicinal utility such as stimulant, carminative, stomachic, expectorant, rubefacient, rheumatism, piles, pulmonary and catarrhal diseases. It is also used in cold influenza and vomiting etc.

Flowering & Fruiting: Not seen.

Local Name: 'Adrak'

2. Curcuma longa Linn. Sp. Pl. 2, 1753; FBI. 6:240, 1890; FUGP. 2:309, Repr. ed. 1960.

Perennial herb with orange-yellow rhizomes. **Leaves** long tufted, oblong lanceolate, emitt smell of fresh mango on being bruished. Flowers in spikes; clothed with leaf sheaths. **Bracts** ovate-

oblong, upper most strile, reddish-purple, lanceolate-oblong. **Calyx** 3-lobed, densely hairy. **Lip** obovate-cuniate. **Staminodes** yellow. **Capsule** ovoid, appressed hairy. **Seeds** reddish-brown.

Extensively cultivated in kitchen gardens for the sake of rhizomes.

Ethnobotanical uses:

It is used in diarrhoea, intermittent fever, dropsy, liver disorders, urinary diseases, anthelmintic, bronchitis. Paste is excellent dressing for sprains, inflammatory affections of the joints, eye-wash, skin diseases and also as contraceptive.

Flowering & Fruiting: Not seen.

Local Name: 'Haldi'

CVI. CANNACEAE

Canna Linn.

Canna indica Linn. Sp. Pl. 1, 1753; FBI. 6:260, 1892; Man. Cult. Pl. 291, 1949; HFDD. 505, 1977.

An erect rhizomatous herb. **Stem** glabrous. **Leaves** oblong-lanceolate, petiole slightly grooved, base sheathing. **Flowers** in lax racemes, bracteate. **Perianth** lobes 6, 3 outer sepaloid, linear-oblong, 3 inner petaloid, oblong-lanceolate. **Stamens** perfect one; staminodes 4-5, 3 of them bright red, petaloid. **Carpels** 3, connate. **Ovary** 3-celled, style 1 flattened, tongue-shaped. **Fruits** papillose, obscurely 3-gonous.

Cultivated in parks and gardens.

Ethnobotanical uses:

Root is used as diaphoretic and diuretic in fevers and dropsy.

Flowering: Almost round the year.

Local Name: 'Keliya'

CVII. IRIDACEAE

Gladiolus Linn.

Gladiolus gandavensis van Houtte, Fl. Ser. t. 1, 1846; Man. Cult. Pl. 283, 1949; HFDD. 5Ø7, 1977.

Bulb tunicated, reddish-brown. **Leaves** sword-shaped, distichous, many nerved. **Flowers** sessile, in terminal spikes, variously coloured; tube funnel-shaped, segments unequal.

Cultivated in gardens.

Flowering: February-April.

Siddiqui 31Ø26, Hardoi.

CVIII. BROMELIACEAE

Karatas Adans.

Karatas fulgens Antonie Bromel. 41, t. 24, 1880-85.

Nidularium fulgens Lem. Jard. Fleur. 4, t. 411 (1854) Misc. 60.

Nidularium pictum Hort. Cf. Gard. Chron. 561, 1869.

Guzmania picta Lem. Jard. Fleur. 4, (1854) Misc. 60.

A stout rhizomatous herb with many spreading leaves. **Young leaves** scarlet-red. **Leaves** in a dense rosette, strap-shaped, green with usually darker spots, scrufy on back, sharply toothed, cuspidate or obtuse at apex. **Flowers** many in a closed clusters among the brilliant scarlet short leaves on a very short scape, composite, sessile, in a nest-like rosette leaves variously modified into involucral bracts like structures, red or purplish white. **Sepals** free. **Petals** connate at base, forming a short tubular structure, campanulate. **Ovary** inferior; style filiform and about equalling anthers; stigma 3-fid. **Fruit** a many seeded berry.

Often found in the hedges of forest and also cultivated as a hedge plant.

Flowering & Fruiting: May-August.

Siddiqui 31959, Shaheed Udhyan.

CIX. AMARYLLIDACEAE

Zephyranthes Herb. nom. cons.

Zephyranthes flava (Herb.) Nichol. Dict. Gard. 4:239, 1887.

Pyrolíron flavum Herb. App. Bot. Reg. 37, 1821.

A bulbous herb. **Leaves** linear, radical. **Flowers** solitary, born on a long scape. **Perianth** lobes usually connate, sulphur-yellow. **Anthers** 6, inserted in the tube. **Carpels** 3 in connate; ovary 3-celled, inferior. **Fruit** a subglobose, 3-lobed, luculicidal capsule. **Seeds** numerous, compressed, black.

Often found in lawns.

Flowering & Fruiting: June-October.

Siddiqui 3115Ø, Hardoi.

The following plants are commonly cultivated in gardens.

1. Amaryllis belladona Linn. Sp. Pl. 293, 1753; Man. Cult. Pl. 257, 1949; HFDD. 5Ø9, 1977.

A bulbous plant. **Leaves** strap-shaped. **Flowers** in umbellate clusters, 2-4 together on stout, hollow, funner-shaped. **Perianth** lobes 6, scarlet-red or white. **Capsule** 3-gonous.

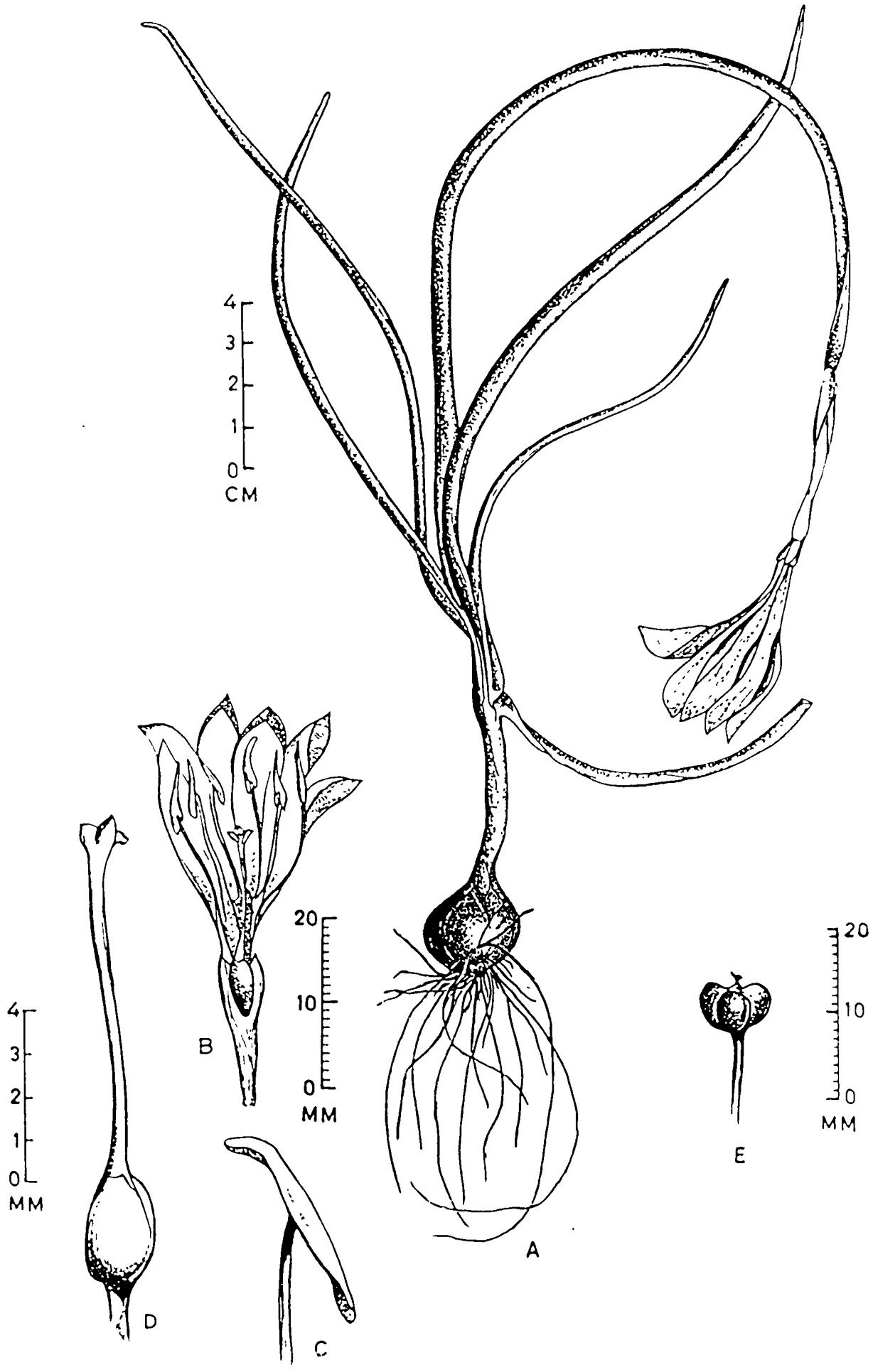
This is the commonly cultivated spices of *Amaryllis* planted in beds as well as pots.

Flowering: February-May.

2. Crinum asiaticum Linn. Sp. Pl. 292, 1753; Man. Cult. Pl. 253, 1949; HFDD. 5Ø9, 1977.

A much spreading, bulbous shrub. **Leaves** oblong-lanceolate.

Zephyranthes flava (Herb.) Nichol.
A. Complete plant, *B.* Flower, *C.* Stamens,
D. Pistil, *E.* Style showing stigma.



Zephyranthes flava (Herb.) Nichol.

Flowers 20-30 in umbellate clusters on compressed scape. **Perianth** lobes 6, salver-shaped, upcurved, stellately patent, white.

Cultivated in gardens.

Flowering & Fruiting: September-March.

Siddiqui 31299, Hardoi.

3. **Zephyranthes grandiflora** Lindl. Bot. Reg. t. 902, 1825; Man. Cult. Pl. 254, 1949; Lawrence Gent. Herb. 8:375, 1949; HFDD. 511, 1977.

Zephyranthes rosea auct. pl. Hort. non Lindl. 1825.

Zephyranthes carinata Herb. Bot. Mag. t. 2594, 1825.

A small bulbous herb. **Leaves** linear. **Flowers** solitary on a long scape. **Perianth** lobes 6, connate, below to form a tube, segments obovate, pink.

Cultivated in gardens.

Flowering: July-August; February-March.

CX. AGAVACEAE

Key to Genera:

Leaves fleshy, either spine tipped or yellow margined or both. Subterrianian stem a rhizome.

Leaves without transverse markings.

Leaves prickly along the margins; flowers greenish - yellow, often inter-mixed with bulbils .....*1. Agave*

Leaves smooth margined; flowers white, bulbils none .....*2. Yucca*

Leaves with transverse markings, tip not spine tipped .....*3. Sansevieria*

Leaves not fleshy; flowers in racemes, fragrant, under ground stem a tuber .....*4. Polianthes*

1. Agave Linn.

Key to species:

Leaves upto 1.5 m long; pedicel upto 1.Ø cm long; tepals connate in the lower part .....1. *A. cantala*

Leaves upto 1.Ø m long; pedicel upto 2.Ø cm long; tepals free near to the base .....2. *A. wightii*

1. Agave cantala Roxb. (Hort. Beng. 25, 1814, nom. nud.) Fl. Ind. ed. Carey 2:167, 1832; Drumm. & Prain, Agric. Ledg. 13:87, 19Ø6; Drumm. Kew Bull. 191Ø:342, 191Ø; Berger, Agav. 236, 1915; FUGP.

2:316, Repr. ed. 1960; HFDD. 512, 1977.

A stout rhizomatous herb, with a single tall scape. **Stem** short, woody. **Leaves** forming a rosette, linear-lanceolate, prickly along the margins, prickles brown, hooked; apex with a long, brown, spine. **Flowers** intermittent with numerous bulbils. **Perianth** lobes 6, greenish-yellow, linear-oblong, almost free, inner smaller, outer larger and broader. **Stamens** exserted, filaments red-brown spotted.

Planted in fencing of orchards etc.

Flowering: May-September.

Siddiqui 31347, Chhatouri.

2. **Agave wightii** Drumm. & Prain, Beng. Agric. Bull. 8:15, 1906; Agric. Ledg. 13:91-92, 1906; FUGP. 2:317, Repr. ed. 1960; HFDD. 513, 1977.

A perennial stout herb. **Leaves** linear-lanceolate; broadly expanded at the base, margins prickly, apex spine tipped. **Flowers** on a tall columner scape, in pyramidal panicle, often replaced by bulbils. **Perianth** lobes 6. **Stamens** 6, filaments unequal. **Fruits** not seen.

Often planted on the fences of orchards.

Ethnobotanical use:

Plant juice is applied on eczema affected portion.

Flowering: March-July.

Local Name: 'Katkuva'

Siddiqui 3148, Chhatouri.

2. Yucca Linn.

Yucca gloriosa Linn. Sp. Pl. 319, 1753; Man. Cult. Pl. 241, 1949; HFDD. 514, 1977.

Caulescent shrub. **Stem** usually simple. **Leaves** linear-lanceolate, smooth margined, tipped with sharp spine. **Flowers** in large panicles, hanging, white.

Planted in gardens.

Flowering & Fruiting: February-August.

3. Sansevieria Thunb., nom. cons.

Key to species:

Leaves tuft; dark-green with transverse markings and yellow margins .....1. *S. thyrsifolia*

Leaves thick, fleshy to rigid coriaceous; dark-green with transverse markings and without yellow margins .....2. *S. zeylanica*

1. Sansevieria thyrsifolia Thunb. Man. Cult. Pl. 240, 1949.

A tuft rhizomatous herb. **Leaves** 2-5 in a tuft smooth margined, without apical spine, dark-green with transverse markings and yellow margins.

Often cultivated as pot plant.

2. Sansevieria zeylanica (Linn.) Willd. Sp. Pl. 2:159, 1799; Wijnands, Taxon 22:114, 1973; HFDD. 514, 1977.

Leaves thick, fleshy to rigidly coriaceous, dark-green with numerous light or greyish-green, irregularly confined transverse bands.

Cultivated for fencing of orchards.

Ethnobotanical use:

Paste of the leaves is applied to affected portion of snake bite.

Flowering: March-April.

Local Name: 'Sapin'

Siddiqui 31956, Bal Vidhya Mandir.

4. Polianthes Linn.

Polianthes tuberosa Linn. Sp. Pl. 316, 1753; Man. Cult. Pl. 239, 1949; HFDD. 513, 1977.

A tuber bearing herb. **Stem** simple. **Leaves** sessile, clasping, entire. green, successively smaller. **Flowers** white, very fragrant. **Perianth** tube curved.

Often cultivated in gardens.

Flowering & Fruiting: Summer and rainy season.

CXI. DIOSCOREACEAE

Dioscorea Linn.

Dioscorea bulbifera Linn. Sp. Pl. 1Ø33; Knuth, Pfreich. 87:88, 1924; Fl. Delhi 335, 1963.

Dioscorea sativa Thunb. Fl. Jap. 15, 1784 (non Linn. 1753); FBI. 6:295, 1892.

A slender, glabrous, herbaceous twiner, with globose to pyriform tubers. **Stem** 4-angular, ribbed. **Leaves** alternate, ovate-triangular to suborbicular, with deeply cordate base, cuspidate, glabrous. **Perianth** lobes white, turning to purple at dark brown after anthesis, lanceolate-oblong pistillode minute. **Female flowers** in peduncles, fascicled spikes. **Staminodes** 6, linear-subulate. **Stigma** 3, recurved.

Cultivated on a small scale in gardens for its tuber which are eaten as vegetables.

Flowering: July-September.

Local Name: 'Ratalu'

CXII. LILIACEAE

Asphodelus tenuifolius Cav. Anal. Cienc. Nat. 3:46. t. 27. f. 2, 1801; FBI. 6:332 (excl. Syn. *A. fistulosus* Linn.), 1892; FUGP. 2:332, Repr. ed. 1960 (excl. Syn. *A. fistulosus* Linn.); Ingram, Baileya 12:1-10, 1964; HFDD. 518, 1977.

Annual herb, without any bulb or stolon. **Leaves** many, radical, terete, acute, striate, sheathing at base, faintly hairy, hairs in longitudinal rows. **Sepals** several from the base, branched above. **Flowers** pinkish-white, laxly racemose, solitary in each bracts. **Pedicels** short. **Perianth** segments oblong, obtuse, with a brownish costa. **Stamens** 6; anthers yellow; filaments abruptly dilated near the base and hairy (the filaments are not equally dilated even in same flower). **Stigma** trifid. **Seeds** black, acutely trigonous, transversely furrowed and finally granulated.

Abundant, as a weed of wheat fields.

Flowering & Fruiting: Cold season.
Siddiqui 31196, Shah Nagar.

The following plants are commonly cultivated in gardens and kitchen gardens:

1. **Allium cepa** Linn. Sp. Pl. 300, 1753; FUGP. 2:335, Repr. ed. 1960; HFDD. 509, 1977.

An annual herb. **Leaves** fistular, dark-green, smooth. **Bulb** tunicated, from reddish-white to dark-red. **Flowers** white in terminal dense globular umbels, with intermixed bulbils.

Extensively cultivated for the sake of bulbs.

Ethnobotanical uses:

It is very common medicinal plant used as stimulant, diuretic, expectorant and rubifacient. Us emmenagogue and diuretic; it is eaten raw. Juice of the bulb is used in piles and its decoction in cough and stranguary and jaundice. Juice is also applied in various skin diseases and insect bites.

Flowering & Fruiting: December-April.

Local Name: 'Piyaz'

2. **Allium sativum** Linn. Sp. Pl. 296, 1753; FUGP. 2:335, Repr. ed. 1960; HFDD. 509, 1977.

Differs from the preceeding species in having solid leaves and the bulbs which are composed of small bulblets or cloves (1-2 seriate), covered by a single membrane and besetting a central woody axis.

Extensively cultivated for the sake of bulbs.

Ethnobotanical uses:

This plant is also very common and having much medicinal value. It is given in fevers, coughs, flatulence, disorders of nervous system, agues, dropsical affections, pulmonary phythisis, wooping cough, diuretic, emmenagogue, skin diseases (ingworm, eczema), asthma, anthelmintic and maggot infested wounds.

Flowering : Never seen in flowering.

Local Name: 'Lahsun'

3. **Asparagus racemosus** Willd. Sp. Pl. 2:152, 1799; FBI. 6:316, 1892; FUGP. 2:327, Repr. ed. 1960; HFDD. 517, 1977.

A large deciduous climber, armed, cladodes more or less acicular, falcate. **Flowers** in racemes, white. **Fruits** red when ripe, fleshy. **Seeds** black.

Commonly cultivated in gardens.

Ethnobotanical uses:

The tuberous roots are demolcent, diuretic, aphrodisiac, laxative expectorant, galactagogue, tonic, cooling, alterative, appetizing, antispasmodic, stomachic, astringent to the bowels diarrhoea, dysentery, tumours, inflammations, biliousness, diseases of the blood, kidney, liver and eye, tuberculosis, leprosy, epilepsy, night blindness, rheumatism, dyspepsia and gonorrhoea.

Flowering & Fruiting: December-March.

Local Name: 'Sataver'

Siddiqui 31279, Hardoi.

4. Aloe barbadensis Mill. Gard. Dict. n. 2, 1768; Man. Cult. Pl. 209, 1949; HFDD. 520, 1977.

A perennial stoloniferous herb. **Leaves** fleshy, radical, broad, tapering towards the apex, soft spinescent. **Flowers** red in dense racemes.

Often cultivated for ornamental and medicinal purposes.

Ethnobotanical uses:

The leaves are alterative, stomachic, aphrodisiac, cathartic, emmenagogic, astringent, antidotal, anthelmintic and hepatic stimulant; after removing the green portions of the leaves the

middle one are given in fevers, enlargement of the liver, spleen and other glands, skin diseases, gonorrhoea, constipation, menstrual suppression, piles, jaundice and rheumatic affections.

Flowering & Fruiting: February-April.

Local Name: 'Ghee-kanwar'

5. Gloriosa Linn.

Gloriosa superba Linn. Sp. Pl. 305, 1753; FBI. 6:358, 1892; FUGP. 2:330, Repr. ed. 1960; HFDD. 519, 1977.

An annual, tuberous, branched climber. Leaves sessile, alternate, ovate, lanceolate, entire; apex modified into tendrils. Flowers in the axils of the upper leaves, forming terminal corymbs. Tepals in mature flowers reflexed, lanceolate, acuminate, margins crispy-undulate, bright-red and yellow in colour. Capsule oblong. Seeds black.

Not uncommon, found climbing on *Zizyphus* sp., *Saccharum benghalense* and *Sizygium cumini*.

Flowering & Fruiting: June-September.

Siddiqui 31367, Hasia.

6. Asparagus plumosus Baker in Journ. Linn. Soc. Lond. 14:613, 1875; Bailey in Man. Cult. Pl. 216, 1949; HFDD. 518, 1977.

A very beautifull climber; cladodes numerous, filiform, arranged in dorsoventrally compressed, compound pinnate frond, triangular in outline. No flowering in the area.

Often cultivated as ornamental

CXIII. PONTEDERIACEAE

Key to Genera:

Flowers zygomorphic; perianth lobes connate.
Petioles swollen into floats .....*1. Eichhornia*

Flowers actinomorphic; perianth lobes free.
Petioles not forming floats .....*2. Monochoria*

1. **Eichhornia** Kunth. nom. cons.

Eichhornia crassipes (Mart.) Solms. in DC. Monogr. Phan. 4:527, 1883; Aq. Ang. 7Ø. f. 48, 1962; Suppl. FUGP. 279, 1976; FPP. 25Ø, 1978.

Pontederia crassipes Mart. Nov. Gen. Sp. 9. t. 4, 1823.

A floating hydrophyte (become rooted in marshy situations and near the edges of the pond), stolons, axillary. **Leaves** radical, dark, shining green, bradly ovate to nearly reniform, erect, margins entire, usually decurved. **Spikes** 1Ø-3Ø flowered on a long peduncle; bracts 2, lower foliaceous, with a tubular sheath, upper tubular, completely enclosed, apiculate. **Flowers** pale-violet, heterosylous; perianth lobes 6, unequal. **Stamens** 6, unequal, curved, exserted, shorter stamens with glabrous filaments and larger with glandular hairy filaments; anthers violet. **Styles** 3. **Stigma** fringed.

Generally this plant is classified as floating hydrophytes, but it becomes rooted when the water level falls.

Abundant in ponds and ditches.

Ethnobotanical uses:

Leaves boiled and steam applied to the testis (in case of hydrocoel). The whole plant burnt and made fine ash mixed with mustard oil and used in eczema and itches.

Flowering & Fruiting: June-December.

Local Name: 'Kumbhi'

Siddiqui 31003, Hardoi.

2. **Monochoria** Presl.

Monochoria vaginalis (Burm. f.) Presl, Rel. Haink. 1:28, 1827; FBI. 6:368, [incl. var. *plantaginea* (Roxb.) Solms.] 1829; FUGP. 2:336, Repr. ed. 1960; HFDD. 523, 1977.

Pontederia vaginalis Burm. f. Fl. Ind. 80, 1768.

Pontederia plantaginea Roxb. Fl. Ind. ed. Carey, 2:123, 1832.

A marshy herb. Root stock short, suberect, spongy. Leaves long, petioled, ovate-lanceolate or ovate-cordate, acute. Flowers bluish in compact axillary racemes, subtended by sheaths. Perianth lobes 6, 2-seriate, outer sepaloid, inner petaloid, bluish-purple with scattered, orange spots. Stamens 6, 1 stamen with horned filament. Fruit a capsule. Seeds many, minute, ribbed.

Commonly found in ponds, ditches and streams.

Flowering & Fruiting: September-November.

Siddiqui 31105, Tanskhera.

CXIV. COMMELINACEAE

Key to Genera:

Stamens 4-6, 3 fertile ones and one-three staminodes:

Flowers subtended by spathaceous bracts .....*1. Commelina*

Flowers not subtended by spathaceous bracts .....*2. Murdania*

1. **Commelina** Linn.

Key to species:

Spathe subsessile; seeds pitted.....1. *C. benghalensis*

Spathe peduncled; seeds smooth.....2. *C. hasskarlii*

1. **Commelina benghalensis** Linn. Sp. Pl. 41, 1753; FBI. 6:370, 1892; FUGP. 2:339, Repr. ed. 1960; HFDD. 526, 1977.

An annual herb with creeping or procumbent branches, rooting at the nodes; nodes swollen. **Leaves** ovate to broadly ovate-elliptic; leaf sheath ciliated at mouth. **Spathe** obtriangular, puberulent, often filled with mucilagenous fluid. **Flowers** blue; clestogamous flowers solitary. **Capsule** glabrous. **Seeds** brownish-black, closely pitted, transversely wrinkled.

Abundant in moist and shady places.

Flowering & Fruiting: August-November.

Siddiqui 31101, Khera.

2. **Commelina hasskarlii** Clarke, Comm. Cyrt. Beng. 13. t. 5, 1874;

in DC. Monogr. Phan. 3:157, 1888; 6:370, 1892; FUGP. 2:339, Repr. ed. 1960; HFDD. 527, 1977.

A creeping or decumbent herb. **Leaves** oblong-lanceolate, narrowed to 6-9 nerved, ciliated leaf sheath. **Flowers** in cymes, enveloped in peduncled, ciliated spathe. **Sepals** 3, dissimilar. **Petals** 3, blue, 2 larger ones clawed, smaller one ovate, subsessile. **Seeds** dark-brown, smooth, truncate at one end.

Occassionally found in marshy places.

Flowering & Fruiting: September-November.

Siddiqui 31007, Bilgram Road.

2. **Murdania** Royle, nom. cons.

Murdania nudiflora (Linn.) Brenan, Kew Bull. 1952:189, 1952; HFDD. 530, 1977.

Commelina nudiflora Linn. Sp. Pl. 41, 1753 (excl. syn. et. ref. Fl. Leyl. et Plukenet); Mant. Pl. 1:177, 1767.

Tradescantia malabarica Linn. Sp. Pl. ed. 2. 412, 1762.

Aneilema nudiflorum (Linn.) R. Br. Prodr. 271, 1810; FBI. 6:378, 1892; FUGP. 2:342, Repr. ed. 1960.

An annual, tufted, erect, or diffused herb. **Stem** simple or branched. **Leaves** linear-oblong-lanceolate, acute at apex; sheath oblique and ciliate at mouth. **Flowers** in few flowered cymes forming terminal panicles, light-pink. **Stamens** 5-6, 3 perfect with hairy filaments and 2-staminodes. **Seeds** dark-brown, truncate at one end, rugose, pitted.

Common among undergrowth in mango orchards.

Flowering & Fruiting: August-November.

Siddiqui 31Ø21, Bilgram Road.

The following plants are often cultivated in gardens and houses.

1. Rhoeo Hance

Rhoeo spathacea (Sw.) Stearn in Baileya 5:198, 1957.

Tradescantia spathacea Sw. Prodr. 57, 1788.

Rhoeo discolor (L'Her) Hance in Walp. Ann. 3:66Ø, 1852.

A perennial herb. **Leaves** crowded towards the upper half of short, thick, unbranched stem, oblong, lanceolate, deep-green above, reddish-purple below. **Flowers** in axillary cymes, enveloped by boat-shaped spathe, white. **Sepals** 3-membranous. **Petals** 3, ephemeral. **Stamens** 6, filaments clothed with beaded hairs.

Commonly planted in pots and rockeries.

Flowering & Fruiting: August-April.

2. Zebrina Schnizl.

Zebrina pendula Schnizl. in Bot. Zeit. 7:87Ø, 1849.

A trailing herb, often with pendulous branches when planted in pots. **Leaves** ovate-oblong, ciliolate, upper surface purple striped, lower one red-purple. **Flowers** enclosed in 2-leafy unequal bracts. **Petals** 3, lobes crimson. **Stamens** 6, filaments petaloid, hairy.

Planted in pots and hanging baskets.

Flowering: Nearly throughout the year.

CXV. JUNCACEAE

Juncus Linn.

Juncus bufonius Linn. Sp. Pl. 328, 1753; FBI. 6:392, 1892; FUGP. 2:346, Repr. ed. 1960; Buch. -Ham. Pfreich. 25:105, 1906, Backer Fl. Males. Ser. 1. 4:212, 1948; HFDD. 532, 1977; FPP. 251, 1978.

Annual, erect, tufted herbs. **Leaves** radial, grass-like, base sheathing. **Flowers** in terminal, biparous or uniparous cymes, secund, bracteate. **Perianth segments** 6, 2-seriate; outer lanceolate; inner obtuse to acuminate, keeled. **Stamens** 6 (rarely 3). **Carpels** 3, connate. **Ovary** 1-celled; style 1; stigma 3, spirally coiled. **Fruit** a capsule, enveloped by perianth lobes, sub-prismatic, many seeded.

Common in the areas near the river.

Flowering & Fruiting: February-April.

Siddiqui 31264, Lucknow Road.

CXVI. ARECACEAE (PALMAE nom. alt.)

Key to Genera:

Leaves pinnate; stem with prominent leaf bases; fruit small, oblong drupe, 2-2.5 cm long ..... *1. Phoenix*

Leaves palmate; stem without leaf bases; fruit large, globose drupe 12 - 15 cm across ..... *2. Borassus*

1. Phoenix Linn.

Phoenix sylvestris (Linn.) Roxb. Hort. Beng. 73, 1814; FBI. 6:425, 1893; FUGP. 2:354, Repr. ed. 1960; Fl. Delhi 343, 1963; Ind. Tr. 645, 1971.

Elate sylvestris Linn. Sp. Pl. 1189, 1753 (Pro parte).

A tall tree, with large, thick, hemispherical crown. **Stem** unbranched, covered with persistent leaf bases, sometimes basal portion of stem surrounded by a mass of adventitious roots, particularly in old trees. **Leaves** pinnate, rachis with expanded base, leaflets 15-45 x 1.5-2.5 cm, thick coriaceous, spiny at apex, lowest leaflets often changed into 4-6 cm long spines. **Flowers** spadix, spathe splitting into 2 boat-shaped structures, thick coriaceous or almost woody. **Male flowers** creamy-white. **Perianth** 6, 2 whorls, coriaceous, subfleshy. **Stamens** 6; filaments short; anthers 2-celled, linear, adnate. **Female flowers** in spadix, same as in male. **Perianth** 6, 3 outer connate, coriaceous. **Staminodes** 3-4, rarely upto 6 in some flowers. **Carpels** 3, free;

stigma hooked. Fruit oblong drupe, nodding, golden-orange colour to reddish-brown when ripe, eddible.

Common on waste lands.

Flowering: March-April; **Fruiting:** May-July.

Local Name: 'Khajoor' or 'Khajooria'

Siddiqui 31298, Jhala.

2. Borassus Linn.

Borassus flabellifer Linn. Sp. Pl. 1187, 1753; FBI. 6:482, 1893; Ind. Tr. 657, 1971.

A tall tree. **Stem** unbranched, ring-like scars of the petiole often distinct. **Leaves** palmately lobed, fan-shaped, rigidly coriaceous, 60-90 spreading segments, 2-fid at apex, folded along the midrib; petiole spinescent serrature along the margins, grooved, ligule minute. **Flowers** dioecious. **Male spadix** 1-3 stout, cylindric, spathe boat-shaped, reddish-brown, thick, coriaceous; flowers small, secund in 2 series on spikelets, mixed with large scaly bracts. **Perianth** 6, in two whorls of 3 each outer narrowly cuneate, inner obovate - spathulate, imbricate. **Stamens** 6; filaments connate; anthers linear-oblong, 2-celled. **Female spadix** simple or sparingly branched; flowers large, globose. **Perianth** 6, in 2 whorls, 3 outer larger, oblong-reniform, coriaceous, accrescent; imbricate, 3 inner smaller. **Staminodes** 6-9. **Carpels** 3, connate; ovary 3-celled, stigma sessile recurved. **Fruit** a globose trigonous drupe, pyrenes 1-3, obcordate, mesocarp, fleshy and fibrous, endosperm horny.

Cultivated in gardens and parks.

Ethnobotanical use:

Decoction of root is used in dysentery.

Flowering: April-May; **Fruiting:** July-September.

Local Name: 'Tarh'

The following plants are commonly cultivated in gardens and parks.

1. **Roystonea** O. F. Cook

Roystonea regia (H. B. & K.) O. F. Cook in Bull. Torrey Bot. Cl. 531, 1901; Man. Cult. Pl. 173, 1949; Fl. Delhi 343, 1963.

Oreodoxa regia H. B. & K. Nov. Gen. & Sp. 1:305, 1815; Blatt. Palms. 396. t. 73, 1926.

A tall tree with globular crown. **Stem** unarmed, ashy-white with annular scars of fallen leaves. **Leaves** pinnately lobed, drooping, base elongated, sheathing.

Often planted in gardens and as an avenue tree.

Flowering & Fruiting: Not seen.

Local Name: 'Bottle-palm'

2. **Livistona chinensis** R. Br. Prodr. 268, 1810; Drude in Engl. & Prantl, Nat. Pfam. 2:335; Blatt. Palms. 104. t. 26; Man. Cult. Pl. 168, 1949; Fl. Delhi 342, 1963.

Latania chinensis Jacq. Frag. Bot. 16. t. 11, 1809.

A fan leaf palm of varying size. **Stem** erect, rough, bearing leaf

bases and fibers. **Leaves** palmately lobed, 50-60 segments, tough; petiole long, spinous upto middle. **Spadix** paniculate-ramose, spreading, spathe basal. **Flowers** small, creamy-white. **Perianth** lobes 6, 2-seriate. **Stamens** 6. **Fruit** spadix, nodding, berries green when raw and black when ripe.

A common palm in gardens and parks.

Flowering & Fruiting: February-May.

Local Name: 'China-tarh'

CXVII. PANDANACEAE

Pandanus Linn.

Pandanus fascicularis Lamk. Encycl. 1:372, 1785; FBI. 6:485, 1893; FUGP. 2:358, Repr. ed. 1960; HFDD. 534, 1977.

A large bushy shrub or small tree, branching from the base. **Leaves** 3-farious, imbricate, erect half way the drooping, tufted at the ends of branches, coriaceous, spinulosely toothed, upper surface glossy green. ***Male flowers*** in branched spadix, spathe boat-shaped and keeled, white. **Flowers** minute, very fragrant, pedicillate; filaments of anthers connate or nearly so; anthers spicately arranged. **Female flowers** on unbranched spadix; spathe 3-ferous. **Carpels** connate, in groups of 4-9, solitary ovule in carpel; style 1; stigma papillose.

Often cultivated in gardens for its fragrant flowers.

Flowering: August-September; **Fruiting:** Not seen.

Typha angustata Bory & Chaub.

CXVIII. TYPHACEAE

Typha Linn.

Typha angustata Bory & Chaub. Exp. Sci. Mor. 2:338, 1832; FBI. 6:489, 1893; FUGP. 2:359, Repr. ed. 1960; HFDD. 535, 1977; FPP. 252, 1978.

A tall perennial herb, rhizome long-creeping covered with distichous scales. **Stem** stout, subterete. **Leaves** linear, entire, plano-convex, glabrous. **Male flowers** in long condensed terminal spikes; female ones also on the same axis but separated by a 2-8 cm long naked axis. **Perianth** represented by numerous linear scales. **Stamens** 2 or 3, intermixed with numerous hairy perianth. **Female flowers** intermixed with numerous bracteoles; ovary seated on hairy stipe. **Stigma** linear. **Fruit** subtended by white or brown bristles. **Ripe spike** turns red.

Abundant in the areas near the canals and river.

Ethnobotanical use:

Leaves are dried and made fine powder, mixed with Gur (solidified crude sugarcane juice) and then are used in piles.

Flowering: November-March; **Fruiting:** April-May.

Local Name: 'Babai'

Siddiqui 31009, Bilgram Road.

CXIX. ARACEAE

Key to Genera:

Climbers.

Leaves perforated and segmented.....*1. Monstera*

Leaves entire, blotched with yellow or yellow-green .....*2. Rhaphidophora*

Erect plants.

Leaves not spotted with red or white.

Leaves 3-partite, corm erect depressed-globose, warty .....*3. Amorphophallus*

Leaves entire;tubers horizontal not warty .....*4. Colocasia*

Leaves spotted with red or white or both .....*5. Caladium*

1. **Monstera** Adans.

Monstera deliciosa Liebm. in Kjoeb. Vidensk. Meddel. 1849.

Monstera lennea C. Koch in Bot. Zeit. 10:277, 1852; Ind. Sem. Hort. Berol. 15, 1853.

A large root climber (assumes erect habit when planted in pot). **Leaves** broad, thick, pinnately cut and perforated. **Flowers** not seen.

Often planted in gardens where it is made to climb on the trunks of other trees, or in pots as indoor plant.

2. **Rhaphidophora** Hassk.

Rhaphidophora aurea (Lind. & Andre) Birdsey, Baileya 10:155-159, 1962; Furtado, Gard. Bull. 20:377-380, 1964; HFDD. 539, 1977.

Pothos aureus Lind. & Andre I 11, Hort. 69:381, 1880.

Scindapsus aureus (Lind. & Andre) Engler, Pfreich. 37:80, 1908.

A very beautifull root climber, commonly known as "Money-plant". **Stem** sulcate between the nodes. **Petiole** slightly winged. **Leaves** ovate, acute, cordate, entire, blotched with yellow. **Flowers** not seen.

Extensively grown both as outdoor and indorr plant.

3. **Amorphophallus** Bl. ex Decne, nom. cons.

Amorphophallus campanulatus (Roxb.) Bl. ex Decne, Nouv. Ann. Mus. Hist. Nat. Paris, 3:366, 1834; FBI. 6:513, 1893; FUGP. 2:363, Repr. ed. 1960; HFDD. 536, 1977.

Arum campanulatum Roxb. Pl. Cor. 3. 68. t. 272, 1820.

A tuberous herb. **Tuber** depressed-globose, warty. **Leaves** emerge after the flowering, long, petiole, 3-partite; segments multifid. **Spathe** obliquely campanulate, purple-pale blotched without, lower inner part with several red papillae. Male part of the spadix shorter than female. **Male flowers** anthers subsessile. **Female flowers** carpels 2-3 celled; stigma 2-3 lobed. **Fruits** orange-red, 2-3 seeded.

Cultivated in kitchen gardens.

Local Name: 'Zimikand'

4. **Colocasia** Schott.

Colocasia esculenta (Linn.) Schott, Meletem. 1:18. 1832; HFDD. 537, 1977.

Arum esculentum Linn. Sp. Pl. 965, 1753.

Arum colocasia Linn. Sp. Pl. 965, 1753.

Colocasia antiquorum Schott, Meletem. 1:18, 1832; FBI. 6:523, 1893; FUGP. 2:365, Repr. ed. 1960.

A tuberous herb, the root stock short and horizontal. **Leaves** with long, purple blotched, rounded-orbicular, apiculate with a triangular basal sinus, glabrous. **Spathe** yellowish, lanceolate-oblong. **Spadix** consisting of three types of flowers, male occupying upper position, female occupying basal portion and the neutral between the two.

Commonly cultivated for the sake of starchy rhizomes.

Flowering & Fruiting: August-December.

Local Name: 'Arvi'

5. **Caladium** Vent.

Caladium bicolor Vent. Jard. Cels. t. 30.

Caladium argyrites Lem in Illustr. Hortic. (1858). t. 185. f. 3. Misc. 57.

Caladium connaertii Hort. ex Engl. in DC. Monogr. Phan. 2:461.

Caladium argyrospilum Lem l. c. 59.

Very attractive pot herbs, propagated by subterranian tuberous stem. **Leaves** on long petiole, blade sagittate-ovate, basal

separated by a narrow sinus, variously mottled (red, white or both) above. No flowering in the area.

A common pot herb, planted both as indoor and outdoor plant.

Flowering & Fruiting: Not seen.

CXX. LEMNACEAE

Key to Genera:

Fronds with roots.

Roots single .....1. *Lemna*

Roots 2-many .....2. *Spirodela*

Fronds rootless .....3. *Wolffia*

1. **Lemna**

Lemna perpusilla Torrey, Fl. N. York 2:245, 1843; Daubs, Illin. Biolog. Monogr. 34:25, 1965; Hartog, Blumea 18:363, 1970; HFDD. 541, 1977.

Lemna paucicostata Hegelm. Lemnac. 138. t. 8. 1868; FBI. 6:556, 1893; FUGP. 2:368, Repr. ed. 1960.

Free floating, minute plants. Root only one; root cap acute. Fronds obliquely ovate-elliptic, rounded at tip, 3-nerved. Flowers and Fruits not seen.

Very common in ditches and ponds.

Siddiqui 31014, Bilgram Road.

2. **Spirodela** Schleid.

Spirodela polyrrhiza (Linn.) Schleid. Linnaea, 13:392,1839; FUGP. 2:368, Repr. ed. 1960; Wilson, Journ. Arn. Arb. 41:66, 1960; Hartog, Blumea 18:360, 1970; HFDD. 541, 1977.

Lemna polyrrhiza Linn. Sp. Pl. 970, 1753; FBI. 6:557, 1893.

A free floating aquatic plant. Roots 2-many (4-9) unequal. Fronds

broadly ovate-obovate, orbicular, dark-green above, purple-red beneath, 5-15 nerved.

Common in ponds and ditches.

Flowering & Fruiting: Not seen.

Siddiqui 31Ø22, Bilgram Road.

3. **Wolffia** Horkel ex Schleid., nom. cons.

Wolffia arrihiza (Linn.) Horkel ex Wimm. Fl. Schles. 14Ø. 1857; FBI. 6:3Ø6, 1892; FUGP. 2:369, Repr. ed. 196Ø; HFDD. 542, 1977.

Free floating, aquatic plant. **Roots** none. **Fronds** ovoid, hemispherical, nearly flat above, convex beneath.

Often associated with *Azolla*.

Flowering & Fruiting: Not seen.

Siddiqui 31Ø27, Tanskhera.

CXXI. ALISMATACEAE

Sagittaria Linn.

Key to species:

Leaves triangular in outline, sagittate at the base; petiole stout keeping the leaves high above the water surface; wing of the seeds entire or subcrenate.....1. *S. sagittifolia*

Leaves elliptic in outline, cordate at the base; petiole long slender; leaves floating; wing of the seeds toothed .....2. *S. guayenensis* Ssp. *lapula*

1. Sagittaria sagittifolia Linn. Sp. Pl. 993, 1753; FBI. 6:561, 1893; FUGP. 2:271, Repr. ed. 1960; FPP. 225, 1978.

A stoloniferous, aquatic or marshy herb. **Leaves** hastate or sagittate; petiole triquetrous. **Flowers** unisexual; the female ones occupying lower position on the scape and sessile, while the male ones occupy upper position and pedicelled, white in colour, usually 3-4 in a whorl. **Stamens** 20-24; **anthers sagittate. Carpels** many free on globose torous. **Achenes** obliquely obovate, compressed and winged.

Abundant on the bank of the river and in nearby areas.

Flowering & Fruiting: January-May.

Siddiqui 31017, Tanskhera.

2. Sagittaria guayanensis HBK. Nov. Gen. Sp. 1:250, 1816; Subsp. *lapula* (D. Don) Bogin, Mem. N. York Bot. Gard. 9:192. f. 5, 1955;

Hartog, Fl. Males. Ser. 1. 5:328, 1957; HFDD. 543, 1977.

Sagittaria guayanensis auct. pl. (non HBK, 1816); FBI. 6:561, 1893; FUGP. 2:372, Repr. ed. 1960.

Lophotocarpus guayanensis var. *lapula* (D. Don) Buchen. Pfreich. 16:36, 1903.

A marshy scapigerous herb. **Leaves** elliptic-ovate, cordate, floating. **Flowers** lower whorls bisexual, upper stminate. **Perianth** segments 6, biseriate, inner white, with yellow blotches. **Stamens** 9-12, in bisexual flowers and 6-10 in staminate flowers. **Achenes** with toothed wing.

Often found in paddy fields and stagnant water bodies.

Flowering & Fruiting: August-December.

Siddiqui 31025, Khera.

CXXII. APONOGETONACEAE

Aponogeton Linn. f.

Aponogeton natans (Linn.) Engl. & Krause in Pfreich. 24:11, 1906; Fl. Delhi 384, 1963.

Saururus natans Linn. Mant. 227, 1771.

Aponogeton monostachyus Linn. f. Suppl. 214, 1781 (*monostachyon*); FBI. 6:564, 1893; FUGP. 2:373, Repr. ed. 1960.

Aquatic submerg herb, with stoloniferous root stock. **Leaves** floating and partially submerged, oblong to linear-oblong, 3-5 nerved long petioled; petiole 5-8 cm long obscurely 3-gonous. **Flowers** in simple spike, scape 10-15 cm long, spike 3.5-8.5 cm long densely flowered. **Perianth** 2, free, obovate-orbicular, white to light pink. **Stamens** 6, free; filaments of unequal length; anthers 2-celled, bluish-purple. **Carpels** 3, apocarpus. **Ovary** 1-celled, 2-6 ovuled; style short; stigma discoid. **Fruit** follicle, subglobose, 4-8 seeded, minutely striate.

Uncommon. Lacalized in some ponds within the area.

Flowering & Fruiting: September-April.

Siddiqui 31120, Tanskhera.

CXXIII. POTAMOGETONACEAE

Potamogeton Linn.

Potamogeton nodosus Poir. in Lamk. Encycl. Suppl. 4:535, 1816; Dandy, Journ. Linn. Soc. Bot. 50:531, 1937; HFDD. 544, 1977.

Potamogeton indicus Roxb. Fl. Ind. ed. Carey & Wall. 1:471, 1820 (non Roth. ex Roem. & Schult. 1818); FBI. 6:565, 1893; FUGP. 2:374, Repr. ed. 1960.

A hydrophyte with creeping root stock. **Stem** cylindrical, green or purplish. **Leaves** dimorphic, submerged leaves, thin, long; floating leaves thicker and shorter, elliptic-lanceolate, oblong, acute to obtuse. **Spikes** dense, rising above the water surface. **Drupelets** small, oblique, shortly beaked.

Common in ponds and road sides ditches.

Flowering & Fruiting: August-November.

Siddiqui 31374, Hasia.

CXXIV. ZANNICHELLIACEAE

Zannichellia Linn.

Zannichellia palustris Linn. Sp. Pl. 969, 1753; FBI. 6:568, 1893; FUGP. 2:376, Repr. ed. 1960; Aq. Ang. 97, 1962; HFDD. 545, 1977.

Slender, perennial hydrophyte with slender root stock. **Leaves** opposite, linear. **Flowers** small, unisexual, each spathe with one male and 2-5 female flowers. **Male flowers** with single stamen. **Female flowers** subtended by hyaline, cupular sheath. **Carpels** 2-5, free. **Style** long; stigme oblique, peltate.

Found in ditches and depression near the canals.

Flowering & Fruiting: September-March.

Siddiqui 31286, Atwa.

CXXV. ERIOCAULACEAE

Eriocaulon Linn.

Eriocaulon cinereum R. Br. Prodr. 254, 1810; Moldenke. Phytologia 3:185, 1949; HFDD. 547, 1977.

Eriocaulon sieboldianum Sieb. & Zucc. ex Steud. Syn. 2:272, 1855; FBI. 6:577, 1893; Ruhland, Pfreich. 13:111, 1903; Fyson, Journ Ind. Bot. Soc. 3:15, 1922; FUGP. 2:377, Repr. ed. 1960.

A small erect annual. **Stem** none. **Leaves** many, radical, linear. **Scapes** many bearing a single globular head at the tip. **Heads** blackish-white. **Involucral bracts** oblong-obovate, glabrous. **Female flowers** shortly pedicelled, outer perianth segments 2-3, inner 2, style 3-fid. **Male flowers** often in the centre of head.

Not uncommon, found in sugarcane fields.

Flowering & Fruiting: September-November.

Siddiqui 31386, Hasia.

CXXVI. CYPERACEAE

Key to Genera:

Florets bisexual.

Fertile glumes distichous .....*1. Cyperus*

Fertile glumes spirally arranged:

Style base constricted or articulated above the nut.

Leaves none; bristles present.....*2. Eleocharis*

Leaves present.

Style flat,hairy;usually persistent .....*3. Fimbristylis*

Style linear, glabrous and usually deciduous .....*4. Bulbostylis*

Style base neither constricted nor articulated; bristles filiform not scale-like .....*5. Scirpus*

Florets unisexual; nut enclosed in a utricle.....*6. Carex*

1. Cyperus Linn.

Key to species:

Spikelets in globose compact heads.

Heads brown-red, 1-2 sessile heads surrounded by 3-several peduncled heads .....1. *C. difformis*

Heads whitish, sessile.

Plant non-stoloniferous.

Terminal clusters consist of three distinct heads, cluster somewhat triangular in outline;bracts 3-4.....2. *C. triceps*

Terminal clusters uniform globular; bracts 5-7 .....3. *C. pygmaeus*

Plant stoloniferous .....4. *C. brevifolius*

Spikelets not in compact heads:

Spikelets digitate; sessile.

Plant with creeping rhizome; perennial; several stem bases forming a straight file; spikes white; glumes 3 - 5 nerved on either side of the keel .....5. *C. niveus*

Plant without creeping rhizome; spikes yellowish-brown; glume with a single nerve close to keel on either side or nerveless .....6. *C. sanguinolantus*

Spikes digitate borne on rays(rays divided or undivided) .....7. *C. tenuispica*

Spikelets spicate.

Primary rays not divided (spikelets arranged in the fashion of leaflets of unipinnately compund leaf).

Glume with a conspicuous recurved mucro; inflorescence compact .....8. *C. aristatus*

Glume without any mucro inflorescence lax .....9. *C. rotundus*

Primary rays divided (atleast some spikelets arranged in the fashion of leaflets of a bipinnate compound leaf) spikelets nearly at right angle to the rachis.

Glume with a broad green keel .....10. *C. irria*

Glume with a narrow keel.....11. *C. compactus*

Spikelets nearly appressed to the rachis, numerous and forming dense terminal clusters .....12. *C. eleusinoides*

1. Cyperus difformis Linn. Cent. Pl. 2:6, 1756; FUGP. 2:382, Repr. ed. 1960; FBI. 6:599, 1893; Kuk. Pfreich. 101:337, 1936; HFDD. 556, 1977; Verma & Misra Ind. Journ. For. 5(3):226-238, 1982; Mukhopadhyay, JETB 9(1):234, 1987.

An erect tufted annual herb with numerous fibrous roots. **Leaves** shorter than the stem, glabrous; sheath not fibrous, reddish, mouth oblique, margins of the mouth hayline. **Spikes** in brown-red globose, compact heads; heads sessile as well as peduncled (on rays), rays upto 2 cm long; bracts leafy 2-3, longest upto 20 cm long. **Glumes** obovate or broadly ovate, obtuse, shortly mucronate. **Stamens** 1-2, nut trigonous, obovoid.

Commonly found in paddy fields and sometimes near ponds.

Flowering & Fruiting: August-December.

Siddiqui 31168, Bhaseta.

2. Cyperus triceps (Rottb.) Endl. Cat. Hort. Ac. Vindob. 1:94, 1842; Kuk. Pfreich. 101:578, 1936; HFDD. 561, 1977; Verma & Misra Ind. Journ. For. 5(3):226-238, 1982.

Kyllinga triceps Rottb. Descr. Ic. 14, 1773; FBI. 6:587, 1893; FUGP. 2:396, Repr. ed. 1960.

A tufted non-stoloniferous, small herb upto 15 cm high. **Leaves** shorter or longer than the stem, somewhat falcate, 0.1-0.2 cm broad. **Bracts** leafy 2-4, the longest upto 7 cm long; terminal head consist of the three spikes, the central one being largest. **Spikelets** white. **Stamens** 2, nut grey, oblong, apiculate.

Abundant in grass lands.

Flowering & Fruiting: July-November.

Siddiqui 31139, Lucknow Road.

3. Cyperus pygmaeus Rottb. Descr. Ic. 20. t. 14. f. 4, 5, 1773; HFDD. 560, 1977; Kern, Fl. Males. 1. 7(3):634, 1974; Verma &

Misra Ind. Journ. For. 5(3):226-238, 1982.

Juncellus pygmaeus (Rottb.) Clarke, FBI. 6:596, 1893; FUGP. 2:395, Repr. ed. 1960.

Cyperus michelianus Link. subsp. *pygmaeus* Rottb. Aschers. & Graebn. Syn. 2:273, 1903.

Tufted annual herb with fibrous roots. **Leaves** shorter than the stem, rarely one or two leaves may exceed; sheath purple tinged, membranous, mouth oblique, usually with a V-shaped cleft on one side. **Spikelets** in a compact, uniform, globular head; subtended by 5-7 bracts, longest upto 7 (-8) cm long. **Glumes** nearly 16-18 in a spike, shortly mucronate; keel obtuse, 2-3 nerved on either sides of the keel. **Nut** ellipsoid, yellow-white.

Common on edges of ponds and ditches.

Flowering & Fruiting: July-December.

Siddiqui 31106, Tanskhera.

4. Cyperus brevifolius (Rottb.) Hassk. Cat. Hort. Bogor. 24, 1844; Kuk. Pfreich. 101:600, 1936; Kern. Fl. Males. 1. 7(3):656, 1974; HFDD. 554, 1977; Verma & Misra, Ind. Journ. For. 5(3):226-238, 1982.

Kyllinga brevifolia Rottb. Descr. Ic. 13. t. 4. f. 3, 1753; FBI. 6:588, 1893; FUGP. 396, Repr. ed. 1960.

An annual to perennial herb with long stolons and deep root. Stolon covered with purple coloured long scales with oblique mouth; average length of the internode 2.5 cm. **Aerial stems** 5-25 cm high (only head bearing stems taken into consideration).

Leaves shorter than the stem, Ø.2-Ø.4 cm broad; sheath loose fittings, not fibrous, purple in colour, obliquely mouthed. **Head** uniform, globular or oblong in outline; bracts 3-4, unequal, longest upto 8.Ø cm long. **Spikelets** numerous, greenish-white; glumes acute, keel scabrid in lower part, 3-4 nerved on either side of the keel.

Common along water channels and on the edges of the paddy fields.

Flowering & Fruiting: July-November.

Siddiqui 311Ø7, Tanskhera.

Cyperus triceps Rottb. Descr. and *Cyperus brevifolius* (Rottb.) Hassk. are sometimes confused with each other. However, following table may be of some help to distinguish between them.

Table showing differences between C. triceps & C. brevifolius

SNo.	C. triceps Rottb.Descr.	C. brevifolius (Rottb.)Hassk.
1.	Non-stoloniferous.	Stoloniferous.
2.	Bracts two-four.	Bracts three-four.
3.	Spikes dirty-white.	Spikes greenish-white.
4.	Keel narrow.	Keel broad green.
5.	Keel not scabrid in the lower part.	Keel scabrid in the lower part.
6.	Spikes composed of three distinct units.	Spikes a single unit.

5. Cyperus niveus Retz. Observ. Bot. 5:12, 1791; FBI. 6:6Ø1,1793; FUGP. 2:383, Repr. ed. 196Ø; Kuk. Pfreich. 1Ø1:288, 1936; HFDD. 557, 1977; Verma & Misra, Ind. Journ. For. 5(3):226-238, 1982.

A perennial herb with a woody and creeping rhizome. Roots comparatively tougher than other species of *Cyperus*. Sheath not fibrous. **Leaves** shorter than the stems. **Spikelets** 5-15 in a terminal digitate cluster, white. **Bracts** 2-4, exceeding the spikelets, the longest uptc 6 cm long. The anthers undergo torsion after dehiscence and assume a rope-like shape. **Nut** triquetrous, white.

Common among the undergrowth in Mango orchards and the vegetation in flood plains of Bhasenta river.

Flowering & Fruiting: March-June.

Siddiqui 31167, Bhasenta river.

6. Cyperus sanguinolentus Vahl, Enum. Pl. 2:351, 1806; Kuk. Pfreich. 101:385, 1936; HFDD. 560, 1977.

Pycreus sanguinolentus (Vahl) Nees (Linnaea. 9:283, 1834 Comb. inval.) ex Clarke, FBI. 6:590, 1983; FUGP. 2:393, Repr. ed. 1960.

A tufted annual non-stoloniferous herb. **Roots** slender not rough. **Leaves** shorter than the stem; sheath loose fitted, mouth truncate. **Spikelets** 10-12 in a cluster, dirty-white, bracts 2-3, longest upto 8 cm long. **Glumes** acute, nerveless or with nerve on either side of the glume, close to it. **Nut** dark-brown.

Common in paddy fields and along water channels.

Flowering & Fruiting: July-December.

Siddiqui 31108, Tanskhera.

7. Cyperus tenuispica Steud. Syn. 2:11, 1855; Kuk. Pfreich. 101:245, 1936; Kern, Reinwardtia, 2:116, 1952; HFDD. 560, 1977;

Verma & Misra, Ind. Journ. For. 5(3):226-238, 1982.

Cyperus flavidus auct. pl. (non Retz. 1789); FBI. 6:600, 1893; FUGP. 2:382, Repr. ed. 1960.

A small herb without woody base or rhizome, upto 20 cm high. **Roots** fibrous. **Leaves** longer or shorter than the stem, 0.1-0.2 cm broad. **Spikelets** digitate on umbellate rays, occasional rays may be divided. **Primary rays** upto 3.5 cm (-4.0 cm) long, basal sheath numerous, loose fitting and oblique mouthed. **Spikelets** 3-7 in a clusters, upto 0.5 cm long, green. **Glumes** ovate-oblong, obtuse, wings of the glume red tinged in lower part. **Nut** white, 3-gonous, finely reticulate.

Common in paddy fields.

Flowering & Fruiting: July-November.

Siddiqui 31109, Tanskhera.

8. Cyperus aristatus Rottb. Descr. Ic. 23. t. 6. f. 1, 1773; FBI. 6:606, 1893; FUGP. 2:385, Repr. ed. 1960; Kuk. Pfreich. 101:502, 1936; HFDD. 554, 1977.

A slender annual herb. **Leaves** shorter than the stem, 0.1-0.2 cm broad, whole plant not more than 15 cm high. **Spikelets** arranged in spicate manner, usually one cluster sessile and rest rayed; rays upto 3.0 cm long. **Bracts** 2-3, upto 6.0 cm long. **Glume** boat-shaped, wings 5-nerved on either side of the narrow keel, yellow-brown or red-brown, apex with a long recurved awn. **Stamen** 1. **Nut** pale-brown.

Common among the grasses on the edges of ditches and paddy fields.

Flowering & Fruiting: July-November.

Siddiqui 31165, Bhaseta.

9. Cyperus rotundus Linn. Sp. Pl. 45, 1753; FBI. 6:614, 1893; FUGP. 2:388, Repr. ed. 1960; Kuk. Pfreich. 101:107, 1935; Kern, Fl. Males. 1. 7(3):604, 1974; HFDD. 560, 1977; Verma & Misra, Ind. Journ. For. 5(3):226-238, 1982; Fl. Himachal Pra. 3:746, 1984; Mukhopadhyay, JETB. 9(1):235, 1987.

Cyperus rotundus subsp. *tuberosus* (Rottb.) Kukenthal in Engler, Pfreich. 101:113, 1936; Kern in Reinwardtia, 6:53, 1961.

Cyperus tuberosus Rottb. Descr. et Icon. 28, t. 7, f. 1, 1773; FBI. 6:616, 1893; BP. 2:1145, 1903; Koyama in Quart. Journ. Taiwan Mus. 14:170, 1961.

A perennial herb. **Rhizome** woody, clothed with fibrous remains of leaf sheaths. **Stem** base swollen; 10-70 cm high. **Leaves** shorter than or equal to the stem, 0.3-0.5 cm broad. **Spikelets** arranged spicately, 5-10 in a spike. **Bracts** 3, unequal, upto 45.0 cm long. **Spikelets** red-brown. **Glumes** ovate, obtuse, decurrent on the rachilla. **Stamens** 3. **Nut** dark-brown.

Abundant nearly in all types of localities.

Ethnobotanical uses:

The plant is diuretic, diaphoretic, astringent and stomachic. The fresh tubers are applied to the breast in the form of paste as galactogogue.

Flowering & Fruiting: January-December.

Local Name: 'Motha'

Siddiqui 31018, Bilgram Road.

10. **Cyperus irria** Linn. Sp. Pl. 45, 1753; FBI. 6:606, 1893; FUGP. 2:385, Repr. ed. 1960; Kuk. Pfreich. 101:150, 1935 (excl. var. *rectangularis*); Kern, Fl. Males. 1. 7(3):616, 1974; HFDD. 557, 1977; Verma & Misra, Ind. Journ. For. 5(3):226-238, 1982; Sikdar & Rao JBNHS. 81(1):145, 1984; Mukhopdhyay JETB. 9(1):234, 1987.

A non-rhizomatous herb. **Leaves** nearly equalling the stem; upto 0.4 cm broad; sheath reddish, not fibrous. **Rays** upto 10, very unequal largest upto 15 cm long, branched in upper part. **Bracts** 4-8, longest upto 40 (-80) cm long. **Glumes** upto 15 in a spikelet, boat-shaped, apex retuse, brown, keel broad and green. **Stamen** 1. **Nut** obovoid, brown, smooth.

Common in rice fields, along drains and edges of ditches.

Flowering & Fruiting: July-November.

Siddiqui 31110, Khera.

11. **Cyperus compactus** Retz. Observ. Bot. 5:10, 1789; Kuk. Pfreich. 101:423, 1936; HFDD. 554, 1977; Kern, Fl. Males. 1. 7(3):638, 1978; Verma & Misra, Ind. Journ. For. 5(3):226-238, 1982.

Mariscus dilutus (Vahl) Nees ex Wt. Contrib. Bot. Ind. 90, 1834; FUGP. 2:398, Repr. ed. 1960.

Cyperus dilutus Vahl, Enum. Pl. 2:357, 1806.

Mariscus microcephalus Presl, Rel. Haenk. 1:182, 1830; FBI. 6:624, 1893.

Erect, perennial herb. **Stem** longitudinally striated. **Leaves** usually equal to the stem, margins and keel more or less scabrid,

upto Ø.5 cm broad. **Spikelets** on branched rays; primary rays upto 1Ø. **Glumes** 8-12 in a spikelet; lowest two glumes small; reddish, acute, 2-3 nerved on either sides of the narrow green keel. **Nut** dirty-white, trigonous, acutely beaked.

Common along water channels.

Flowering & Fruiting: July-November.

Siddiqui 31Ø2Ø, Bilgram Road.

12. Cyperus eleusinoides Kunth, Enum. Pl. 2:39, 1837; FBI. 6:6Ø8, 1893; FUGP. 2:386, Repr. ed. 196Ø; Kuk. Pfreich. 1Ø1:144, 1935; Kern, Reinwardtia, 2:111, 1952; HFDD. 556, 1977.

A large perennial herb, upto 1ØØ cm tall. **Leaves** equal to or longer than the stem, Ø.5-Ø.8 cm broad. **Inflorescence** a compound umbel with numerous pale-golden spikelets crowded towards the end of the rays. **Rays** upto 15 and longest upto 22 (-25) cm long. **Bracts** 5-7, scabrid on the margins. **Nut** triquetrous, dark-brown.

Common in paddy fields.

Flowering & Fruiting: July-November.

Siddiqui 31Ø15, Bhaseta.

2. Eleocharis R. Br. (= Heleocharis Lestib.)

Eleocharis palustris R. Br. Prodr. 224, 181Ø; Som Deva & Naithani Ind. For. 1ØØ:648, 1974; Verma & Misra, Ind. Journ. For. 5(3):226-238, 1982.

A tufted stoloniferous herb; roots fibrous, black when dry. **Leaves** none. **Sheaths** red-tinged, loose fitting, membranous, striated, mouth usually truncate, the sheath are distinctly red

punctate, near the mouth the punctae are more dense to form a narrow band encircling the mouth; maximum breadth of the stem Ø.2 cm. **Spikelets** upto Ø.4 cm broad and 1.8 cm long, ovate-acute; lowest two glumes very large, broadly keeled and look as the continuation of the stem. **Fertile glumes** smaller, obtuse, brown tinged; keel narrow, green; margins hayline. **Bristles** 4-6, restrorsely scabrid. **Nut** biconvex, pale, tipped by the broadly conical style base.

Found in marshy places.

Flowering & Fruiting: September-February.

Siddiqui 31111, Tanskhera.

3. **Fimbristylis** Vahl, nom. cons.

Key to species:

Spikelets single, terminal.

Bracts none; nut biconvex, reticulate.....1. *F. schoenoides*

Bracts present (usually 2), nut trigonous, tubercled .....2. *F. ovata*

Spikelets numerous; in branched, umbellate cymes.

Bracts (not bracteoles) reaching nearly to the top of inflorescence or exceeding it.

Spikelets over Ø.5 cm long; bracts leafy; nut obovoid, white or light straw coloured, with

transverse markings .....3. *F. dichotoma*

Spikelets not more than Ø.5 cm long .....4. *F. bisumbellata*

Bracts reaching hardly up to the middle of inflorescence.

Spikelets globose .....5. *F. miliacea*

Spikelets linear-lanceolate .....6. *F. tenera*

1. **Fimbristylis schoenoides** (Retz.) Vahl, Enum. Pl. 2:286, 18Ø6; FBI. 6:634, 1893; FUGP. 2:4Ø2, Repr. ed. 196Ø; HFDD. 566, 1977; Verma & Misra, Ind. Journ. For. 5(3):226-238, 1982; Fl. Himachal Pradesh 3:751, 1984.

A perennial tufted non-rhizomatous herb, upto 25 (-3Ø) cm high. **Leaves** filiform, shorter than the stem, upto Ø.1 cm broad. **Spikelets** solitary (Occassionally paired) terminal, upto 1.2 cm long, ovate, acute; bracts none. **Glumes** broadly ovate-rounded; shortly mucronate, upto Ø.4 cm long and Ø.3 cm broad; margins hyaline. **Rachilla** chaffy, after the fall of glumes. **Nut** biconvex, obovate, stipitate and reticulate.

Common among the edges of water bodies and paddy fields.

Flowering & Fruiting: August-November.

Siddiqui 31Ø82, Lakhimpur Road.

2. **Fimbristylis ovata** (Burm.) Kern in Blumea 15:126, 1967 et Fl. Males. 1. 7(3):563, 1974; FPP. 263, 1978; Verma & Misra, Ind. Journ. For. 5(3):226-238, 1982.

Carex ovata N. Burm. Fl. Ind. 194, 1768.

Fimbristylis monostachya (Linn.) Hassk. Pl. Jard. Rar. 61, 1848.

Cyperus monostachyos Linn. Mant. 180, 1768.

A tufted non-stoloniferous herb. **Leaves** filiform slightly scabrid towards the apex. **Spikelets** upto 2 cm long; lowest two glumes often different; long mucronate; remaining glumes acute, shortly mucronate. **Nut** 3-gonous, tubercled. **Rachilla** chaffy after the fall of glumes and nuts; the scales broader than those of *F. schoenoides*.

Often grows in association with *F. schoenoides*.

Flowering & Fruiting: August-Novemebr.

Siddiqui 31080, Lakhimpur Road.

3. **Fimbristylis dichotoma** (Linn.) Vahl, Enum. Pl. 2:287, 1806; Kern, Reinwardtia, 6:46, 1961; HFDD. 565, 1977; Verma & Misra, Ind. Journ. For. 5(3):226-238, 1982; Sikdar & Rao JBNH. 81(1):145, 1984; Mukhopdhyay, JETB. 9(1):235, 1987.

Scirpus dichotomus Linn. Sp. Pl. 1:50, 1753.

Fimbristylis diphylla (Retz.) Vahl, Enum. Pl. 2:289, 1806; FBI. 6:636, 1893 [incl. var. *annua* (Roem. & Schult.) Clarke]; FUGP. 2:402, Repr. ed. 1960.

An erect, tufted annual herb. **Leaves** shorter than the stem; some of them falcate, margins scabrid in upper part; thickened, upto 0.3 cm broad. **Flowering stem** upto 45.0 cm high, with spikelets in terminal umbells. Primary bracts 3-5, not very long but at least one of them always exceeding the inflorescence. **Rays** 5-8. **Spikelets** upto 1.5 cm long, ovate, acute; there is a red ring at

the junction of spikelet and the peduncle. **Glumes** ovate, rounded, obtuse, shortly mucronate, chestnut brown; margins hyaline; base obliquely truncate. **Nut** obovoid, straw-coloured; minutely tubercled, tubercles arranged in longitudinal rows.

Common in grassy localities near the water bodies and paddy fields.

Flowering & Fruiting: July-November.

Siddiqui 31112, Tanskhera.

4. **Fimbristylis bisumbellata** (Forsk.) Bub., Dodec. 30, 1950; Kern, Fl. Males. 1. 7(3):579, 1974; HFDD. 564, 1977; Verma & Misra, Ind. Journ. For. 5(3):226-238, 1982.

Scirpus bisumbellatus Forsk. Fl. Aeg.-Arab. 1:15, 1775.

Fimbristylis dichotoma auct. pl. (non Vahl, 1806); FBI. 6:635, 1893; FUGP. 2:403, Repr. ed. 1960.

A small tufted; non-rhizomatous annual, upto 25.0 cm high. **Leaves** linear, falcate (particularly in dwarf specimens), upto 0.2 cm broad; margins of the leaf sheath membranous, golden-brown, red, punctate. **Flowering stem** upto 20. **Primary bracts** unequal, at least one over topping the inflorescence or nearly equalling. **Spikelets** ovoid-ellipsoid, acute upto 0.5 cm long. **Glumes** ovate, mucronate, glabrous, keeled; keel green. **Nut** resembles that of *F. dichotoma* but smaller in size.

Commonly found in cultivated fields and on dry beds of river.

Flowering & Fruiting: July-December.

Siddiqui 31100, Bhasenta river.

5. **Fimbristylis miliacea** (Linn.) Vahl, Enum. Pl. 2:287, 1806; FBI. 6:644, 1893; FUGP. 2:406, Repr. ed. 1960; HFDD. 565, 1977; Verma & Misra, Ind. Journ. For. 5(3):226-238, 1982; Fl. Himachal Pradesh, 3:750, 1984; Mukhopdhyay, JETB. 9(1):235, 1987.

Scirpus miliaceus Linn. Syst. Nat. ed. 10. 860, 1759 (excl. determinatione '*miliaceus*').

Fimbristylis littoralis Gaud. Freyc. Voy. Bot. 413, 1826; Blake, Journ. Arn. Arb. 35:217, 1954.

An annual herb, 10-45 cm long. **Stem** slender, compressed. **Leaves** shorter or longer than the stem, 3-angular, 1.5-2.0 mm broad. **Inflorescence** a decompound umbel with 3-5 rays. **Spikelets** brown, subglobose, 2-3 x 1.3 mm. **Glumes** oblong, obtuse, glabrous. **Stamens** 2, style densely hairy in the upper part. **Achene** obovoid, dirty-white, verrucose.

Common in the rice fields.

Flowering & Fruiting: July-November.

Siddiqui 31087, Tanskhera.

6. **Fimbristylis tenera** Roem. & Schult. Mant. Syst. 2:57, 1824; FBI. 6:642, 1893; FUGP. 2:406, Repr. ed. 1960; HFDD. 566, 1977; Verma & Misra, Ind. Journ. For. 5(3):226-238, 1982.

A non-rhizomatous tufted herb. **Leaves** linear, shorter than the stem, falcate, with one or two prominent nerves. **Sheath** red punctate. **Flowering stem** 5-15 (sometimes even less than 5). **Primary bracts** filiform, shorter than the inflorescence. **Primary rays** divided only once or twice. **Spikelets** brown-red, linear-

lanceolate; rachilla ragged with scales. **Nut** obtusely trigonous, tubercled.

Found in paddy fields.

Flowering & Fruiting: July-November.

Siddiqui 31Ø89, Tanskhera.

4. **Bulbostylis** Kunth, nom. cons.

Bulbostylis barbata (Rottb.) C. B. Clarke in FBI. 6:651, 1893; Kern, Fl. Males. 1. 7(3):539, 1974; HFDD. 549, 1977; FUGP. 2:4Ø8, Repr. ed. 196Ø; Verma & Misra, Ind. Journ. For. 5(3):226-238, 1982.

Scirpus barbatus Rottb. Progr. 27, 1972.

A non-rhizomatous, tufted annual herb with fibrous roots. **Stem** seriate. **Leaves** filiform; margins thickened; midrib prominent, sheath with ciliate mouth. **Spikelets** 3-15 in terminal or pseudo-lateral digitate clusters, sessile, light-brown in colour. **Glumes** boat-shaped, keeled, nerveless; wings puberulous. **Nut** trigonous, whitish, minutely tubercled; apex with a knob.

Common in sandy soil.

Flowering & Fruiting: July-November.

Siddiqui 31Ø84, Tanskhera.

5. **Scirpus** Linn.

Key to species:

Spikelets 1-many, sessile, combined in
simple clusters; bristles none:

Flowers placed laterally on stem:

Scales ovate, acute at apex, scarcely keeled .....1. *S. articulatus*

Scales mucronate, distinctly keeled .....2. *S. roylei*

Flowers in terminal clusters .....3. *S. affinis*

Spikelets numerous, combined into umbellate cymes; bristles usually present:

Umbell simple or subcapitate:

Scales 6-7 mm long; bristles scabrid .....4. *S. tuberosus*

Scales 3-4 mm long; bristles plumose .....5. *S. littoralis*

1. **Scirpus articulatus** Linn. Sp. Pl. 47, 1753; FBI. 6:656, 1893; FUGP. 2:410, Repr. ed. 1960; Fl. Delhi, 361, 1963.

A caespitose herb, 30-80 cm high; clums tufted, fistular, spongy; sheaths 2-4.5 cm long, oblique at mouth, scarious, multinerved. **Spikelets** 0.8-1.5 cm long, broadly lanceolate, light-brown, combined into simple, dense lateral head; scales ovate, 3-4 mm long, membranous, scarsely keeled. **Stamens** usually 3. **Achenes** obovoid, triquetrous, 1.2-1.5 mm across, transversely striate, black.

Common in marshy situations.

Flowering & Fruiting: September-December.

Siddiqui 31093, Hasia.

2. Scirpus roylei (Nees) Parker in FUGP. 2:410, Repr. ed. 1960; Fl. Delhi, 362, 1963.

Isolepis roylei Nees in Wt. Contrib. 107, 1834.

Scirpus quinquefarius Buch. -Ham. ex Boeck. in Linnaea 36:701, 1870; FBI. 6:657, 1893.

An erect annual herb, 10-30 cm high; clums tufted, terete, septate transversely; sheaths scarious, loosely covered with oblique mouth. Spikelets 0.5-1.2 cm long, combined into dense lateral head, situated almost at right angle to the clum; scales elliptic-oblong, 2.5-3.0 mm long, mucronulate, scarious with excurrent keel. Achenes narrowly obovoid, triquetrous, transversely striate with scattered black dots.

Common in low-lying areas.

Flowering & Fruiting: October-December.

Siddiqui 31073, Tanskhera.

3. Scirpus affinis Roth. in R. & S. Syst. 2:140, 1817; Raymond in Nat. Conad. 86:227, 1959; Fl. Delhi, 362, 1963.

Scirpus strobilinus Roxb. Hort. Beng. 6, 1814, nom. nud. & Fl. Ind. 1:222, 1820.

Scirpus maritimus var. *affinis* Clarke in FBI. 6:659, 1893; FUGP. 2:412, Repr. ed. 1960.

A perennial somewhat robust shrub, 0.9-2.5 m high with tuber bearing; creeping rhizomes, clums stout, striate, 3-gonous; sheaths 2.5-5.0 cm long with truncate or concave mouth. Spikelets ovate-oblong, 1-2 cm long, golden-brown, combined into dense

terminal or subterminal clusters of 2-5, subtended by foliaceous bracts; scales broadly ovate, puberulent, notched, notched at summit, mid-vein prolonged into 2-3 mm long curved awn, scarious along margins. **Bristles** usually 4 or 3-6, unequal, fragile, scabrid. **Achenes** dark-brown to black, 3-4 mm across, glossy, obovoid, plano-convex, uniformly dotted, scarsely beaked.

Abundant in marshy places.

Flowering & Fruiting: February-May.

Siddiqui 31Ø33, Bilgram Road.

4. Scirpus tuberosus Desf. Fl. Atlant. 1:5Ø, 1798; Beetle in Amer. Journ. Bot. 29:84, 1942; Fl. Delhi, 363, 1963.

Scirpus maritimus Linn. Sp. Pl. 51, 1753; pro parte; FBI. 6:658, 1893; FUGP. 2:412, Repr. ed. 196Ø.

A stout perennial herb, Ø.7-1.5 m high with tuber bearing rhizomes; clums triquetrous; orifice of sheaths truncate. **Leaves** as long as stem, 2-3 mm broad, scabrid along margin, keeled. **Spikelets** ovate to cylindric, 1.2-1.5 cm long, reddish-brown, combined in terminal cluster, subtended by long, foliaceous bracts; scales 5-6 mm long, ovate, puberulent, notched at the tip, awned from the sinus; bristles 5-6, fragile, scarcely barbed. **Stamens** 3; filaments filiform; anther linear-oblong. **Achenes** broadly ovate, plano-convex, 3.5-4.Ø mm across, dark-brown, polished, minutely beaked.

Abundant in marshy situations within the area.

Flowering & Fruiting: February-May.

Siddiqui 31Ø38, Bhanseta.

5. Scirpus littoralis Scharc. var. *subulatus* (Vahl) Chigv. Pl. Nov. ect. ex Aethiopia 16, 1928; Koyama in Canad. Journ. Bot. 41(7):1126, 1963.

A stout perennial herb, 50-90 cm high; clums terete below, triquetrous towards top; sheaths scarious. Spikelets 1.0-1.5 cm long, combined into lax corymbose or paniculate umbelliform, lateral clusters, drooping; scales elliptic-oblong, concave 2-3 mm long, reddish-brown with scarious margins, midrib extend to short awn; bristles 4-5, soft, linear, plumose at apex. Achenes obovoid, compressed, more or less palno-convex, 2-3 mm across, dark-brown, finely striate microscopically, smooth to naked eyes.

Common in marshy places within the area.

FLowering & Fruiting: August-December.

Siddiqui 31076, Tanskhera.

6. Carex Linn.

Carex fedia Nees in Wigt. Contrib. 129, 1934; FPP. 257, 1978.

Carex wallichiana auct. (non Spreng.); FBI. 6:747, 1894; FUGP. 2:418, Repr. ed. 1960.

An erect rhizomatous, marshy herb, upto 75.0 cm high. Leaves basal, equal to the stem, upto 0.3 cm broad; margins smooth; midrib keeled abaxially; sheath breaking up into fibers, fibers appearing like feathers. Spikelets recemose, each spikelet borne on a short peduncle in the axil of a bract. Female spikelets 2-5, towards the base while male ones 3-6, towards the apex. Lower

most bract the longest, uptc 45.Ø cm long, bracts subtending male spikelets shorter than the corresponding spikelets. Achenes elliptic, elongate, 3-gonous, enclosed in pubescent perigynium.

Often found in road-sides ditches and on the banks of the rivers and canals.

Flowering & Fruiting: January-April.

Siddiqui 31Ø91, Tanskhera.

CXXVII. POACEAE

Grasses, perhaps the most embrassing group of plants from identification point of view, pose further problems when a single key is provided consisting of all the tribes and subtribes. Therefore, traditional method of assigning a specimen first to a group, then to a tribe and finally to genus and species have adopted. This renders the keys less confusing and easy to follow. The keys to groups, tribes and to genera of tribe Paniceae are after Bor (1960).

Key to Groups:

Spikelets two-flowered, falling entire at maturity, usually with the upper floret hermaphrodite and the lower male or barren and if the latter, often reduced to lemna or rarely the lemna entirely absent, all alike or more often varying in size, shape & structure, frequently dorsally compressed.....Panicoideae

Spikelets one to many flowered, breaking up above the more or less persistant glumes,or if falling entire then not 2-flowered with the lower floret male or barren & the upper harmaphrodite, usually more or less laterally compressed or terete or if 2-flowered and falling entire, the glumes & lemnas all membranous and with a globose wrinkled seed which splits the palea when mature .....Pooideae

Key to Tribes of Panicoideae:

Male and female spikelets in separate inflo rescence or in different parts of the same inflorescence and of different appearance; lemnas hyaline or membranous & thinner than the glume .....1. Maydeae

Spikelets all harmaphrodite,or with male or barren and harmaphrodite spikelets mixed in the same inflorescenec and so arranged that a male or barren spikelet is near a harma-phrodite spikelet or if unisexual then the lemna of fertile floret indurated.

Spikelets often paired with 1-sessile and the other pedicelled,those of each pair similar or more often dissimilar, rarely solitary and all alike, glumes as long as spikelets and enclosing the florets, more or less rigid and firmer than the lemnas which are both hyaline or membranous, upper lemna usually awned .....2. Andropogoneae

Spikelets solitary or paired, more or less similar;glumes usually membranous the lower usually smaller or sometimes suppressed; lower lemna mostly resemb-ling the upper glume in texture, upper

lemna papery to very tough and rigid, usually awnless .....3. Paniceae

Key to Tribes of Pooideae:

Spikelets borne in open or contracted spikelet panicles, less often in racemes or spikes.

Fertile florets two or more in a spikelet, if one then strile florets above it.

Lemna and rachilla glabrous or hairy but the hairs never envelop the lemna, or if so then the lemna with a geniculate awn.

Glume shorter than the lowest floret & the upper floret distinctly exserted.

Lemnas five-many nerved, awnless or if awned the simple; stigmas 2; ovary glabrous at the apex, or if hairy at least without a hairy appendage; lemnas dull, membranous to coriaceous, exserted from the glumes; glumes two or one .....4. Festuceae

Lemnas one-three nerved inflorescence of panicles or racemes.

Inflorescence a panicle or if raceme or spike then the spikelets not secund .....5. Eragrosteae

Inflorescence a raceme or panicle, spikelet secund .....6. Chlorideae

Glume longer than or equal to the lowest floret, often as long as the spikelet and enclosing the spikelet; lemna awnless or awned from the back; awn usually kneed; ligules membranous .....7. Aveneae (33. *Avena*)

Lemna and rachilla joints bearing long silky hairs which enveloped the lemna, tall grasses .....8. Arundineae (34. *Arundo*)

Fertile floret one in a spikelts with or without, often much reduced, 1 or 2 male or barren florets below it.

Glumes minute(usually represented

by two semicircular inconspicuous lips); fertile lemna & palea very similar in shape and texture .....9. Oryzeae

Glumes well developed; fertile lemna and palea not similar.

Spikelets with 3-florets, lower florets well-developed never transversely rugose or flanged .....10. Phalarideae (37. *Phalaris*)

Spikelets with one-floret; rachilla dis-articulating above the more or less persistant glumes; leaf-blade linear sessile.

Spikelets very rarely falling entire and then with firmly membranous to coriaceous, awned or 5-nerved lemnas; lemna hyaline or membranous.

Lemna 3-5 nerved, frequently awned; glume longer and firmer than the hyaline lemna .....11. Agrostideae

Lemna 1-3 nerved, awnless; glumes & lemnas very similar in texture .....12. Sporoboleae (*40. Sporobolus*)

Spikelet falling entire at maturity, spikelets solitary; glumes awned; awns bluish .....13. Perotideae (*41. Perotis*)

Spikelets sessile on opposite sides of the rachis of solitary spike or spike - like raceme; ovary hairy; grain longitudinally furrowed, lodicules hairy; lemnas 3-5 or many nerved .....14. Triticeae

1. Tribe - Maydeae

Key to Genera:

Male & female spikelets in the same inflorescence; female spikelet single, enclosed in a very hard globose involucre .....*1. Coix*

Male & female spikelets in separate inflorescence; male inflorescence terminal; female in lower axils; female spikelets numerous on a thick axis, covered by spathes.....*2. Zea*

2. Tribe - Andropogoneae

Key to Genera:

Plant more than 1 m tall.

Inflorescence when mature, silky or cottony.

Spikelets awned .....3. *Erianthus*

Spikelets awnless .....4. *Saccharum*

Inflorescence not cottony or silky.

Panicle leafy.

Involucral spikelets covered with tubercled based bristles; sessile spikelet awned; awn nearly 4-5 cm long .....5. *Themeda*

Involucral spikelet glabrous sessile spikelets awnless or very shortly awned .....6. *Apluda*

Panicle not leafy.

Panicle contracted; lower glume tubercled .....7. *Vetiveria*

Panicle open; lower glume not tubercled .....8. *Sorghum*

Plants not more than 50-60 cm tall.

Nodes with a ring of hairs.

Inflorescence cylindric; cottony when mature .....9. *Impereta*

Inflorescence consisting of sub-digitately arranged, racemes not cottony ....10. *Dichanthium*

Nodes without any ring of hairs.

Vegetative parts glabrous or if hairy then the hair not tubercled based.

Plant ascending, rooting at the lower nodes; inflorescence reddish; spikelets shortly pedicelled ....11. *Chrysopogon*

Plants erect, not rooting at lower nodes;spikelet sessile or long pedicelled.

Spikelets long pedicelled ....12. *Capillipidium*

Spikelets sessile.

Lower glume with transverse ridges; spike symmetrical; awns spreding ....13. *Ischaemum*

Lower glume without ridges; spike-

lets secund; awns twisted around each other like a rope ....14. *Heteropogon*

Vegetative parts with tubercle based hairs; spikes several in group & axillary, giving a beaded appearance ....15. *Hackelochloa*

3. Tribe - Paniceae

Key to Genera:

Spikelets arranged in more or less open panicles or with the panicles contracted & spike-like.

Spikelets not subtended by bristle-like branches; upper glumes as long as the spikelets ....16. *Panicum*

Spikelets subtended by bristle-like branches which remain after the spikelets have fallen; upper lemnas after transversely rugose ....17. *Setaria*

Spikelets arranged in one-sided spike or spike-like racemes; spikes or racemes digitate or scattered, rarely solitary.

Lemna of upper florets more or less crustaceous or coriaceous usually with

narrow inrolled margins exposing much of the palea.

Lower glume and the lowest internode of the rachilla not forming a swollen callus at the base of spikelets.

Lower glume when present, turned away from the rachis of the racemes or spikes; the back of the upper lemna facing it *i.e.* spikelet abaxial.

Lower glume usually absent; spikelets plano convex ....18. *Paspalum*

Lower glumes present.

Glumes acuminate or awned rarely only acute; upper lemna not mucronate.

Leaf blades linear; raceme dense; culms erect or suberect ....19. *Echinochloa*

Leaf blades lanceolate to ovate; raceme loose to moderately dense; culm creeping and ascending....20. *Oplismenus*

Glume awnless, if acuminate thenwith upper lemna mucronate.

Upper lemna acute not mucronate ....21. *Paspalidium*

Upper lemna obtuse, mucronate or very shortly awned....22. *Urochloa*

Lower glume turned towards the rachis; the back of the upper lemna turned away from it *i.e.* spikelets adaxial ....23. *Brachiaria*

Lower glumes and lowest internode of rachilla forming a swollen callus at the base of the spikelets; upper lemna mucronate or

short awned ....24. *Eriochloa*

Lemna of the upper floret thinly cortilaginous, usually with flat hyaline margins ....25. *Digitaria*

4. Tribe - Festuceae

Key to Genera:

Spikelets awnless in panicles ....26. *Poa*

Spikelets awned in simple racemes ....27. *Lolium*

5. Tribe - Eragrosteae

Key to Genera:

Spikelets pedicelled in panicles; lemna 3-nerved ....28. *Eragrostis*

Spikelets sessile in secund spikes.

Spikes arranged digitately or subdigitately, apiculate ....29. *Dactyloctenium*

Spikes arranged pinnately acute ....30. *Desmostachya*

6. Tribe - Chlorideae

Key to Genera:

Spikelets awned ....31. *Chloris*

Spikelets awnless ....32. *Cynodon*

9. Tribe - Oryzeae

Key to Genera:

Leaves broad; sheath inflated ....35. *Hygroryza*

Leaves narrow; sheath not inflated ....36. *Oryza*

11. Tribe - Agrostideae

Key to Genera:

Panicle slender, compact; glume awnless ....38. *Alopecurus*

Panicle broad, loose; glume awned ....39. *Polypogon*

14. Tribe - Triticeae

Key to Genera:

Spikelets normally solitary at each node, more than 2-flowered; glumes more than one-nerved, glumes & lemnas keeled at the back....42. *Triticum*

Spikelets more than one at each node; spikelets 1-flowered ....43. *Hordeum*

1. Coix Linn.

Coix lacryma-jobi Linn. Sp. Pl. 972, 1753; FBI. 7:100, 1896; Raizada *et al*. Ind. For. Rec. (N. S.) Bot. 4:176, 1957; GBCIP. 264, 1960; HFDD. 595, 1977.

Annual-perennial. **Culms** erect, rooting at base; nodes glabrous. **Leaves** lanceolate, glabrous, acuminate. **Ligule** obsolete. **Racemes** spiciform, endrogynous, solitary or fascicled. **Male spikelet** 3-nate, embricate with pedicelled one in the middle. **Lower glume** lanceolate-elliptic, keeled with wind inflexed margins, ciliolate along the wings and keels. **Upper glume** lanceolate, acuminate, 13-15 nerved, winged on the keel in the upper half. **Female spikelets** solitary, enclosed in ovoid-globose, whitish, bony involucre.

Often found in marshy places.

Siddiqui 31Ø96, Bhasenta.

2. **Zea** Linn.

Zea mays Linn. Sp. Pl. 971, 1753; FBI. 7:1Ø2, 1896; Raizada *et al* Ind. For. Rec. (N. S.) Bot. 4:175, 1957; GBCIP. 217, 196Ø; HFDD. 654, 1977.

Male spikelets terminal, lax panicle with pendulous branches. **Female spikelets** seated on the spongy axis of the cylinderical spike.

Cultivated as grain and forage crop. Locally called as 'Makka'.

Siddiqui 313Ø4, Hardoi.

3. **Erianthus** Michx.

Erianthus ravennae (Linn.) P. Beauv. Ess. Agrost. 14, 1812; Raizada *et al* Ind. For. Rec. (N. S.) 14:187, 1957; GBCIP. 151, 196Ø; HFDD. 615, 1977.

Andropogon revennae Linn. Sp. Pl. ed. 2:1481, 1763.

Erianthus elephantinus Hook. f. FBI. 7:122, 1896.

Culms tall, stout, glabrous. **Leaves** smooth on both surfaces. **Ligule** a fringe of hairs. **Spikelets** ovate-lanceolate. **Callus** bearded. **Lower glume** ovate-lanceolate, 3-5 nerved, 2-dentate, flat and hairy on the dorsal side. **Upper glume** lanceolate, acuminate, subaristate.

Commonly found along railway-tracks, edges of cultivated fields and near abandoned brick klins.

Siddiqui 31Ø42, Hardoi Railway Track.

4. **Saccharum** Linn.

Key to species:

Stem more than 1 cm in diameter without sugary juice.

Sheath glabrous .....1. *S. spontaneum*

Sheath silky-hairy .....2. *S. bengalense*

Stem upto 2.0-2.5 cm in diameter filled with sugary juice .....3. *S. officinarum*

1. **Saccharum spontaneum** Linn. Mant. Pl. 2:183, 1771; FBI. 7:118, 1896; Raizada *et al* Ind. For. Rec. (N. S.) Bot. 4:185, 1957; GBCIP. 214, 1960; HFDD. 639, 1977.

Perennials. **Culms** erect, glabrous. **Leaves** linear-filiform, glaucous beneath, often reduced to the mid-rib, scabrid on the margin. **Ligule** a scarious rim. **Sessile spikelets** linear-lanceolate. **Lower glume** lanceolate, sharply acute, lower 1/3rd indurate and turning to brownish in fruiting, upper 2/3rd membranous, ciliate at the top, 2-nerved. **Upper glume** acuminate.

Very common on the dry beds of the canal and adjoining areas.

Siddiqui 31029, Sharda Canal, Hardoi.

2. **Saccharum bengalense** Retz. Observ. Bot. 5:16, 1789; GBCIP. 211, 1960; HFDD. 638, 1977.

Saccharum munja Roxb. -Fl. Ind. ed. Carey & Wall. 1:256, 1820.

Saccharum arundinaceum Hook. ?. FBI. 7:119, 1896; pro parte (non Retz. 1789).

Erianthus munja (Roxb.) Jeswit, Arch. -Suikerind, Ned. Ind. 399, 1925; Raizada *et al* Ind. For. Rec. (N. S.) Bot. 4:186, 1957.

Perennials. **Culms** erect. **Leaves** linear, somewhat glaucous beneath, scabrid on the margin. **Ligule** a ciliate, truncate rim. **Panicle** dense, white villous with whorled branches. **Sessile spikelets** lanceolate, acute, 2-nerved. **Upper glume** acute or finely acuminate, glabrous, ciliate on the keel at the top.

Common on dry river beds and on the edges of cultivated fields. Locally called as 'Moonj' and the fibers extracted from the leaves as used to make ropes.
Siddiqui 31Ø28, Bank of Sharda Canal.

3. Saccharum officinarum Linn. Sp. Pl. 54, 1753; GBCIP. 212, 196Ø; FPP. 288, 1978.

This species locally called as 'Ganna' or 'Ikh'.
Siddiqui 31Ø92, Sadai behta.

5. Themeda Forssk.

Themeda arundinacea (Roxb.) Ridley, Trans. Linn. Soc. Bot. Ser. 2. 3:3Ø1, 1893; Raizada *et al* Ind. For. Rec. (N. S.) Bot. 4:252, 1952; GBCIP. 25Ø, 196Ø; HFDD. 648, 1977.

Anthistiria arundinacea Roxb. Fl. Ind. ed. Carey & Wall. 1:256, 182Ø.

Anthistiria gigantea Hack. Subsp. *arundinacea* (Roxb.) Hack. in DC. Monogr. Phan. 6:674, 1889; FBI. 7:27Ø, 1896.

Perennials. **Culms** stout, reed-like, glabrous. **Ligule** a minute, scarious rim. **Panicle** pendulous, upto 3Ø cm long. **Racemes**

2-4-nate. **Involucral spikelets** lanceolate. **Lower glume** clothed with golden-brown or yellow tubercle based hairs, 2-keeled. **Upper glume** glabrous. **Callus** bearded.

Occassionally found in the fallow-lands.

Siddiqui 31Ø68, Shah Nagar.

6. **Apluda** Linn.

Apluda mutica Linn. Sp. Pl. 82, 1753; GBCIP. 93, 196Ø; HFDD, 582, 1977.

Apluda varea auct. FBI. 7:15Ø, 1896.

Perennials. **Culms** slender, erect-ascending. **Leaves** linear, acuminate. glabrous. **Ligule** scarious, rounded. **Racemes** copious, subtended and enclosed in a peduncled spathe, combine into a leafy panicle. **Spikelets** 3-nate, 1 sessile and 2 pedicelled, of which reduced to an empty glume.

Found occassionally near the villages.

Siddiqui 31Ø6Ø, Tanskhera.

7. **Vetiveria** Lem. -Lisanc.

Vetiveria zizanioides (Linn.) Nash. in Small, Fl. South East U.S. 67, 19Ø3; Raizada *et al* Ind. For. Rec. (N. S.) Bot. 4:22Ø, 1957; GBCIP. 258, 196Ø; HFDD. 653, 1977.

Phalaris zizanioides Linn. Mant. Pl. 2:183, 1771.

Andropogon squarrosus sensu Hook. f. FBI. 7:186, 1896 (non Linn. f. 1781).

Perennials, with a rhizomatous rootstock which emits aromatic,

stout roots. **Culms** erect. **Ligule** a minute scarious rim. **Sessile spikelets** yellowish, turning to darkish on maturity, lanceolate, acute. **Lower glume** lanceolate, subacute, muriculate on the back particularly on the nerves, 5-nerved. **Upper glume** concave, spinulously muricate on the keel at the top. **Pedicelled spikelets** linear-lanceolate.

Often found near villages on field edges. Locally called as 'Khas-khas'.

Siddiqui 31Ø91, Tanskhera.

8. **Sorghum** Moench.

Key to species:

Leaves linear, narrow; panicle open.....1. *S. halepense*

Leaves broad; panicle close and dense.....2. *S. vulgare*

1. **Sorghum halepense** (Linn.) Pers. Syn. Pl. 1:1Ø1, 18Ø5; GBCIP. 222, 196Ø; HFDD. 645, 1977.

Holcus halepensis Linn. Sp. Pl. 1Ø47, 1753.

Andropogon halepensis (Linn.) Brot. Fl. Lusit. 1:89, 18Ø4; FBI. 7:183, 1896, pro parte.

Perennials, with a creeping rootstock. **Culms** erect, often decumbent and rooting below. **Leaves** with a contracted base. **Panicle** effuse. **Sessile spikelets** elliptic, acute. **Callus** short bearded. **Lower glume** coriaceous except membranous tip, ciliate, 2-toothed, hairy on the back in the upper part, with 7 intra-cranial nerves. **Upper glume** acute, ciliate, hairy on the back at the top. **Pedicelled spikelets** lanceolate, acute.

Abundant in agricultural fields and on road sides in late-rainy and early winter season.

Siddiqui 31Ø77, Lakhimpur Road.

2. **Sorghum vulgare** Pers. Syn. 1:1Ø1, 18Ø5; Blatt. & MacC. Bomb. Gr. 58; Fl. Delhi 4ØØ, 1963.

Andropogon sorghum Brot. Fl. Luist. 1:88, 18Ø4; 7:183, 1896.

Holcus sorghum Linn. Sp. Pl. 1Ø47, 1753.

Cultivated as grain and forage crop. Locally called as 'Jwar' or 'Churry'.

Siddiqui 31Ø75, Hardoi.

9. **Imperata** Cyr.

Imperata cylindrica (Linn.) P. Beauv. Ess. Agrost. 165, 1812; Raizada *et al* Ind. For. Rec. (N. S.) Bot.4:182, 1957; GBCIP. 169, 196Ø; HFDD, 619, 1977.

Lagurus cylindricus Linn. Syst. nat. ed. 1Ø. 878, 1759.

Imperata arundinacea Cyr. Pl. Rar. Neap. 2:26, 1792; FBI. 7:1Ø6, 1896.

Perennials, with a creeping rhizomatous rootstock. **Culms** erect; nodes glabrous or bearded. **Leaves** linear, glabrous, scabrid, ciliate at base. **Ligule** a scarious, erose rim. **Spikelets** linear-lanceolate, acute. **Callus** bearded with white, soft hairs. **Lower glume** lanceolate, acuminate, hairy on the back.

Very common in lawn during winter.

Siddiqui 31Ø69, Hardoi.

10. **Dichanthium** Willemet

Dichanthium annulatum (Forssk.) Stapf. in Prain, Fl. Trop. Afr. 9:178, 1917; Raizada *et al* Ind. For. Rec. (N. S.) Bot. 4:233, 1957; GBCIP. 133, 1960; HFDD. 601, 1977.

Andropogon annulatus Forssk. Fl. Aegypt. -Arab. 173, 1775; FBI. 7:196, 1896.

Perennials. **Culms** decumbent-ascending; nodes purple-tinged, bearded. **leaves** with a rounded or subcordate base, glabrous or hirsut with tubercled base hairs on the upper surface. **Racemes** 2-4, subdigitate. **Sessile spikelets** oblong, truncate or obtuse with a short bearded callus. **Lower glume** oblong, truncate, 2-keeled, ciliate on the keel, 5-nerved. **Upper glume** lanceolate, acute, 3-nerved. **Pedicelled spikelets** oblanceolate, spathulate, reduced to empty glumes.

Abundant in lawns, waste places, on road sides and often on walls.

Siddiqui 31086, Lakhimpur Road.

11. **Chrysopogon** Trin., nom. cons.

Chrysopogon aciculatus (Retz.) Trin. Fund. Agrost. 188, 1820; Raizada *et al* Ind. For. Rec. (N. S.) Bot. 4:218, 1957; GBCIP. 115, 1960; HFDD. 594, 1977.

Perennials with a woody, creeping rhizome. **Culms** erect or decumbent-ascending; nodes glabrous. **Leaves** mostly sub-basal, obtuse or acute, rounded or subcordate at base, glabrous. **Ligule** a scarious rim. **Lower glume** bidentate, 3-nerved. **Upper glume**

Aristate, ciliate.

Not uncommon found in fallow-lands.

Siddiqui 31Ø98, Sadai behta.

12. **Capillipedium** Stapf

Capillipedium assimile (Steud.) A. Camus in Lecomte, Fl. Gen. Indo-Chine 7:314, 1922; Raizada *et al* Ind. For. Rec. (N. S.) Bot. 4:226, 1957; GBCIP. 11Ø, 196Ø; HFDD. 592, 1977.

Andropogon assimilis Steud. in Zoll. Syst. Verz. 58, 1854; Syn. 1:397, 1854; FBI. 7:1791, pro parte.

Perennials. **Culms** decumbemt and rooting below with scandant branches; nodes bearded. **Leaves** linear. **Ligule** ciliate. **Panicle** decompound with bearded nodes. **Sessile spikelets** Ø.2-Ø.22 cm long. **Callus** bearded. **Lower glume** ciliate on the keels with 3-intracarinal nerves. **Upper glume** lanceolate, 3-nerved. **Pedicelled spikelets** pedicel with a translucent furrow, ciliate.

Sometimes found among dense vegetation.

Siddiqui 31Ø63, Hasia.

13. **Ischaemum** Linn.

Ischaemum rugosum Salisb. Ic. Strip. Rar. 1:t. 1. 1791; FBI. 7:127, 1896; Raizada *et al* Ind. For. Rec. (N. S.) Bot. 4:2ØØ, 1957; GBCIP. 184, 196Ø; HFDD. 62Ø, 1977.

Annuals. **Culms** erect or ascending from the decumbent and rooting base; nodes bearded. **Leaves** linear-lanceolate, acuminate, hairy, narrowed into a short petiole at base. **Racemes** in pairs, yellowish, erect. **Sessile spikelets** ovate-oblong, obtuse. **Lower**

glume chartaceous in the lower 2/3rd membranous and in the upper 1/3rd, slightly oblique with 3-6 transverse ridges and inflexed margins. **Upper glume** obtuse or shortly bidentate, ciliate at the top with a winged, ciliate keel. **Pedicelled spikelets** Ø.4-Ø.43 cm long. **Lower glume** winged along one side. **Upper glume** without a winged keel.

Very common in damp places, partcularly on the edges of the road side ditches.

Siddiqui 31Ø88, Lakhimpur Road.

14. Heteropogon Pers.

Heteropogon contortus (Linn.) P. Beauv. ex Roem. & Schult. Syst. Veg. 2:836, 1817; Raizada *et al* Ind. For. Rec. (N. S.) Bot. 4:247. 1957; GBCIP. 163, 196Ø; HFDD. 618, 1977; FPP. 281, 1978.

Andropogon contortus Linn. Sp. Pl. 1Ø45, 1753; FBI. 7:199, 1896.

Annuals or perennials. **Culms** erect or decumbent-ascending; nodes glabrous. **Leaves** linear, acute or acuminate, ciliate at base. **Ligule** a ciliate, scarious rim. **Sessile spikelets** lower ones male or neutral, awnless; upper ones female, awned, lanceolate. **Lower glume** lanceolate, truncate, hairy on the back. **Upper glume** linear, truncate, hairy on the back.

Found in damp and shaddy places.

Siddiqui 31Ø7Ø, Tanskhera.

15. Hackelochloa O. Kuntze, nom. cons. prop.

Hackelochloa granularis (Linn.) O. Kuntze, Rev. Gen. Pl. 2:776, 1891; Raizaa *et al* Ind. For. Rec. (N. S.) Bot. 4;2Ø5, 1957;

GBCIP. 159, 1960; HFDD. 617, 1977.

Cenchrus granularis Linn. Mant. Pl. 2:575, 1771.

Manisuris granularis (Linn.) Linn. f. Nov. Gram. Gen. 40, 1779; FBI. 7:159, 1896.

Annuals. **Culms** erect, hirsute with tubercled base hairs; nodes bearded. **Leaves** lanceolate, acute with a cordate base, ciliate, hirsute. **Racemes** spiciform, compressed, on hirsute peduncles. **Sessile spikelets** globose. **Lower glume** rounded-orbicular, pitted and tubercled. **Upper glume** oblong, obtuse, coriaceous in the upper half, membranous in the lower half. **Pedicelled spikelets** ovate-lanceolate, acute. **Lower glume** flat on the back with one winged keel and one exalate keel. **Upper glume** scabrid on the keel.

Occassionally found in damp places.
Siddiqui 3107*2*, Tanskhera.

16. **Panicum** Linn.

Key to species:

Leaves with cilia on surface as well as margins .....1. *P. trypheron*
Leaves without any cilia .....2. *P. paludosum*

1. **Panicum trypheron** Schult. Mant. Syst. 2:244, 1824; GBCIP. 331, 1960; HFDD. 630, 1977.

Panicum tenellum Roxb. (Hort. Beng. 7, 1814, nom. nud.); Fl. Ind. ed. Carey & Wall. 1:309, 1820 (non Lamk. 1791).

Annuals. **Culms** slender; nodes glabrous often purplr-tinged.

Leaaves hairy. **Panicle** effuse with patent branches. **Spikelets** elliptic acuminate. **Lower glume** ovate, acuminate-cuspidate, scabrid at the top, 5-nerved. **Upper glume** acute or acuminate, 7-nerved.

Commonly found on grassy localities and cultivated fields.
Siddiqui 31Ø61, Hardoi.

2. **Panicum paludosum** Roxb. Fl. Ind. ed. Carey & Wall. 1:31Ø, 182Ø; GBCIP. 329, 196Ø; HFDD. 629, 1977.

Panicum proliferum auct. pl. (non Lamk. 1797); FBI. 7:5Ø, 1896.

Annual-perennials. **Culms** decumbent or creeping and rooting below, ascending upwards; nodes glabrous. **Ligule** a ring of hairs. **Panicles** effuse with patent branches. **Spikelets** lanceolate, acute. **Lower glume** cup-like or sub-orbicular, obtuse or truncate. **Upper glume** ovtae-lanceolate, acute, 9-nerved.

Common on the edges of ditches and on marshy lands.
Siddiqui 31Ø56, Bilgram Road.

17. **Setaria** P. Beauv.

Key to species:

Involucral bristles retrorsely barbed.....1. *S. verticillata*

Involucral bristles antrorsely barbed.....2. *S. glauca*

1. **Setaria verticillata** (Linn.) P. Beauv. Ess. Agrost. 51:178, 1812; FBI. 7:8Ø, 1896; GBCIP. 365, 196Ø; HFDD. 644, 1977; FPP. 289, 1978.

Panicum verticillata Linn. Sp. Pl. ed. 2. 82, 1762.

Annuals. **Culms** erect; nodes glabrous. **Leaves** linear-lanceolate, narrowed to the base, scabrid to the margins, hairy with tubercled base hairs. **Panicle** dense, cylindrical. **spikelets** usually 2 with one imperfect and one fertile, rarely solitary, ovate, subobtuse. **Lower glume** ovate, apiculate, 3-nerved. **Upper glume** ovate, apiculate, 5-nerved.

Very common in shaddy places.

Siddiqui 31Ø58, Bilgram Road.

2. **Setaria glauca** (Linn.) P. Beauv. Ess. agrost. 51, 169, 178, 1812; FBI. 7:78, 1896; GBCIP. 36Ø, 196Ø; HFDD. 641, 1977; FPP. 289, 1978.

Panicum glaucum Linn. Sp. Pl. 56, 1753.

Annual-perennials. **Culms** decumbent-ascending; nodes glabrous. **Leaves** ciliate at base, glaucous beneath, hairy on the upper surface. **Rachis** pubescent-tomentose. **Involucral bristles** golden-yellow. **Spikelets** solitary, often with an imperfect one. **Lower glume** ovate-rounded, acute, 3-nerved. **Upper glume** ovate, subacute, 5-nerved.

Commonly found in sandy places.

Siddiqui 31Ø64, Tanskhera.

18. **Paspalum** Linn.

Key to species:

Spikelets nearly orbicular,whitish;rachis with prominent mid-rib and faint lateral nerves; whole plant turns brown when dry.....1. *P. scrobiculatum*

Spikelets acute, lanceolate; rachis with mid-rib and lateral nerves nearly similar the plant remain green when ripe .....2. *P. distichum*

1. **Paspalum scrobiculatum** Linn. Mant. Pl. 1:29, 1767; FBI. 7:10, 1896 (pro parte); GBCIP. 340, 1960; HFDD. 632, 1977; FPP. 286, 1978.

Annuals. **Culms** decumbent-ascending, rooting below; nodes glabrous. **Leaves** linear-lanceolate, white margined. **Spikelets** 2-seriate, whitish, rounded-obovate. **Lower glume** absent. **Upper glume** 5-7 nerved.

Commonly found in shaddy and moist localities.
Siddiqui 31149, Pihani Road.

2. **Paspalum distichum** Linn. Syst. Nat. ed. 10. 2:855, 1759; GBCIP. 338, 1960.

Found with the association of *P. scrobiculatum*.
Siddiqui 31125, Bilgram Road.

19. **Echinochloa** P. Beauv.

Echinochloa colonum (Linn.) Link. Hort. Berol. 2:209, 1833; GBCIP. 308, 1960; HFDD. 607. 1977; FPP. 277, 1978.

Panicum colonum Linn. Syst. Nat. ed. 10. 2;870, 1759; FBI. 7:32, 1896.

Annuals. **Culms** prostrate or decumbent-ascending, rooting below; nodes glabrous. **Spikelts** 2-3-nate, elliptic, acute, hispid. **Lower glume** ovate, acute, 5-nerved. **upper glume** acute, 7-nerved, hairy.

Found on edges of cultivated fields and ditches.

Siddiqui 311Ø3, Khera.

20. **Oplismenus** P. Beauv.

Key to species:

Leaves smaller; ligule hairs not exserted,
spikes dense; rachis hairy .....1. *O. burmannii*

Leaves larger; ligule hairs exserted, spike
lax; rachis glabrous .....2. *O. compositus*

1. **Oplismenus burmannii** (Retz.) P. Beauv. Ess. Agrost. 54, 168, 169, 1812; FBI. 7:68, 1896; GBCIP. 317, 196Ø; HFDD. 626, 1977.

Panicum burmannii Retz. Observ. Bot. 3:1Ø, 1783.

Annuals. **Culms** prostrate or decumbent-ascending, often rooting below, glabrous or hairy with a single line of hairs; nodes glabrous or pubescent. **Leaves** acute or acuminate, hairy with tubercled base hairs. **Ligule** a ciliate rim. **Spikelets** 2-3-nate, lanceolate, acute. **Lower glume** ovate-lanceolate, obtuse, ciliate, hairy on the back, 3-nerved, awned. **Upper glume** ciliate, 5-nerved.

Grows in shaddy places.

Siddiqui 31151, Pihani Road.

2. **Oplismenus compositus** (Linn.) P. Beauv. Ess. Agrost. 51:168, 169, 1812; FBi. 6:66, 1896; GBCIP. 317, 196Ø; HFDD. 626, 1977; FPP. 284, 1978.

Panicum compositus Linn. Sp. Pl. 57, 1753.

Annuals. **Culms** prostrate or decumbent-ascending, rooting below,

glabrous except a single line of hairs. **Leaves** acute or acuminate, hairy. **Spikelets** 2-3-nate, interrupted, lanceolate, acute. **Lower glume** 5-nerved. **Upper glume** 9-nerved.

Very common in Mango orchards where it forms a thick vegetation. Siddiqui 31148, Pihani Road.

21. **Paspalidium** Stapf

Paspalidium flavidum (Retz.) A. Camus in Lecomte, Fl. Gen. Indo-Chine, 7:419, 1922; GBCIP. 333, 1960; HFDD. 630, 1977; FPP. 286, 1978.

Panicum flavidum Retz. Observ. Bot. 4:15, 1786; FBI. 7:28, 1896.

Annual-perennials. **Culms** decumbent-ascending, rooting below, compressed; nodes glabrous. **Panicle** falciform, recurved with 5-10 remote racemes. **Spikelets** 2-nate, subsessile, ovoid-ellipsoid, obtuse. **Lower glume** 5-nerved. **Upper glume** 7-nerved.

Common on road sides, fields and in waste lands.
Siddiqui 31184, Manjhola.

22. **Urochloa** P. Beauv.

Urochloa panicoides P. Beauv. Ess. Agrost. 53. t. 11. f. 1, 1812; GBCIP. 372, 1960; HFDD. 653, 1977; FPP. 291, 1978.

Panicum javanicum Hook. f. FBI. 7:35, 1896, pro parte.

Annuals. **Culms** prostrate, spreading or decumbent-ascending, rooting below; nodes pubescent. **Leaves** ovate-lanceolate to oblong acute or acuminate with a cordate base, crispy-ciliate-hairy. **Spikelets** 2-seriate, glabrous, elliptic-ovate, acute. **Lower glume** 5-nerved. **Upper glume** 13-nerved.

Often found in sandy soil.

Siddiqui 31147, Pihani Road.

23. **Brachiaria** Griseb.

Brachiaria ramosa (Linn.) Stapf in Prain, Fl. Trop. Afr. 9:542, 1919; GBCIP. 284, 1960; HFDD. 591, 1977; FPP. 272, 1978.

Panicum ramosum Linn. Mant. Pl. 1:29, 1767; FBI. 7:36, 1896, pro parte.

Annuals. **Culms** decumbent-ascending, **rooting from the lower nodes**; nodes pubescent. **Leaves** lanceolate, **cordate**, **ciliate**, **glabrous** or finely pubescent. **Spikelets** apiculate. **Lower glume** glabrous, 5-nerved. **Upper glume** pubescent, 7-nerved.

Common on road sides, cultivated fields and lawns.

Siddiqui 31166, Pihani Road.

24. **Eriochloa** Kunth.

Key to species:

Spikelets acute, opressed thinly hairy, often with reddish tinge .....1. *E. procera*

Spikelets shortly awned, hairs spreading, not with reddish tinge .....2. *E. nubica*

1. **Eriochloa procera** (Retz.) C. E. Hubbard in Kew Bull. 1930:256, 1930; GBCIP. 312, 1960; FPP. 281, 1978.

Agrostis procera Retz. Observ. Bot. 4:19, 1786.

Very common in damp places.

Siddiqui 31057, Bilgram Road.

2. **Erichloa nubica** (Stud.) Hack. et. Stapf ex Thell. in Vierteljs Chrft. Nat. Ges. Zurich, 64, 697, 1919; GBCIP. 312, 1960.

Helopus nubicus Stud. Syn. Pl. Glum. 1:100, 1854.

Found in agricultural fields and other moist localities.
Siddiqui 31052, Tanskhera.

25. **Digitaria** Heist. ex Fabricius

Digitaria violascens Link. Hort. Berol. 1:229, 1827; Henr. Monogr. Digit. 790, 1950; GBCIP. 308, 1960; HFDD. 607, 1977.

Annuals. **Culms** decumbent-ascending,rooting below; nodes glabrous. **Racemes** 3-6, subdigitate. **Spikelets** 2-3-nate, elliptic, acute. **Lower glume** absent. **Upper glume** hairy, 5-nerved.

Not common, found in the areas near the rivers.
Siddiqui 31045, Dharera river.

26. **Poa** Linn.

Poa annua Linn. Sp. Pl. 68, 1753; FBI. 7:345, 1896; GBCIP. 555, 1960; HFDD. 635, 1977.

Annuals. **Culms** decumbent-ascending, flaccid; nodes glabrous, **Leaves** linear, subobtuse, glabrous. **Ligule** ovate-rounded. **Panicle** effuse with patent or erectopatent branches. **Spikelets** lanceolate oblong, obtuse, 4-5 flowered. **Lower glume** lanceolate, obtuse, glabrous. **Upper glume** ovate-lanceolate, subacute, 3-nerved.

Abundant in lawns, on the edges of fields and other damp places.
Siddiqui 31037, Hardoi.

27. **Lolium** Linn.

Lolium temulentum Linn. Sp. Pl. 83, 1753; FBi. 7:309, 1896; GBCIP. 546, 1960; HFDD. 622, 1977; FPP. 283, 1978.

Annuals. **Culms** erect; nodes glabrous. **Ligule** a minute, scarious rim. **Rachis** flexuous. **Spikelets** elliptic-oblong. **Lower glume** absent. **Upper glume** 7-9 nerved.

Often found in lawns.

Siddiqui 31053, Hardoi.

28. **Eragrostis** P. Beauv. emend. Reichb.

Key to species:

Nodes of the central axis with long hairs; spikelets white with pinkish tinge, upto 7-flowered .....1. *E. coarctata*

Nodes of the central axis without long hairs; spikelets reddish not more than 5-flowered .....2. *E. japonica*

Pedicels of the spikelets 2.0 mm or more long.

Spikelets lanceolate (broadest in the middle).

Pedicels in most of the cases shorter than or equal to the spikelets.

Pedicels with a gland above the middle .....3. *E. poaeoides*

Pedicels without glands above the middle .....4. *E. atrovirens*

Pedicels in most of the cases longer than the spikelet, nodes without hairs or rarely with one to two bristles .....5. *E. gangetica*

Spikelets ovate(broadest at the base) tinged with red .....6. *E. unioloides*

1. **Eragrostis coarctata** Stapf in Hook. f. FBI. 7:313, 1896; GBCIP. 5Ø7, 196Ø; HFDD. 611, 1977; FPP. 279, 1978.

Annuals. **Culms** erect or decumbent-ascending, glabrous; nodes glabrous, purple tinged, viscous. **Leaves** viscid-glandular. **Panicles** reddish-purple. **Spikelets** 1Ø-flowered. **Glumes** subequal, lanceolate, acute, 1-nerved, scabrid on the keels.

Occassionally found on dry beds of the river and in adjoining areas.

Siddiqui 31141, Etouli Bridge.

2. **Eragrostis Japonica** (Thunb.) Trin. Mem. Acad. Sci. Petersb. Ser. 6. 1:4Ø5, 1831; GBCIP. 5Ø9, 196Ø; HFDD. 612, 1977; FPP. 28Ø, 1978.

Poa japonica Thunb. Fl. Jap. 51, 1785.

Eragrostris interrupta var. *tenuissima* Stapf ex Hook. f. FBI. 7:316, 1896.

Annuals. **Culms** decumbent-ascending or erect; nodes glabrous. **Leaves** scabrid. **Panicles** greenish or purplish. **Spikelets** ovate,

purplish, 4-6 flowered. **Glumes** subequal, ovate-oblong, obtuse, 1-nerved.

In dry paddy fields, road side ditches and other marshy localities.
Siddiqui 31134, Sadai behta.

3. **Eragrostis poaeoides** P. Beauv. Ess. Agrost. 162, 1812; GBCIP. 512, 196Ø; HFDD. 612, 1977; FPP. 28Ø, 1978.

Poa eragrostis Linn Sp. Pl. 68, 1753.

Eragrostis minor Host, Gram. Austr. 4:15, 18Ø9, nom. inval.; FBI. 7:321, 1896.

Annuals. **Culms** decumbent-ascending; nodes glabrous. **Leaves** linear, scabrid and glandular along the margin. **Spikelets** lanceolate. **Glumes** unequal, subobtuse, 1-nerved.

Common in flood plains of rivers and other sandy localities.
Siddiqui 31Ø41, Etouli Bridge.

4. **Eragrostis atrovirens** (Desf.) Trin. ex Steud. Nom. ed. 2. 1:562, 184; GBCIP. 5Ø3, 196Ø; HFDD. 61Ø, 1977.

Poa atrovirens Desf. Fl. Atlant. 1:73, t. 14, 1798.

Perennials. **Culms** erect; nodes glabrous, purple tinged. **Leaves** linear, acuminate, with scabrid, enrolled margins. **Spikelets** 1Ø-12 flowered. **Glumes** ovate-lanceolate, 1-nerved.

Often found near water bodies and marshy places.
Siddiqui 31Ø46, Etouli Bridge.

5. **Eragrostis gangetica** Roxb. Steud. Syn. 1:166, 1854; GBCIP. 508, 1960; HFDD. 611, 1977; FPP. 279, 1978.

Poa gangetica Roxb. Fl. Ind. ed. Carey & Wall. 1:341, 1820.

Eragrostis stenophylla Hochst. ex Miq. Verh. Konink. Nederl. Inst. 3:4, 39, 1851, pro parte; FBI. 7:318, 1896, pro parte.

Annuals. **Culms** decumbent-ascending or suberect; nodes glabrous. **Leaves** linear-subulate. **Spikelets** slate-grey-coloured. **Glumes** subequal, ovate-lanceolate, subacute, 1-nerved with a scabrid keel.

Common in sandy soil.

Siddiqui 31047, Etouli.

6. **Eragrostis unioloides** (Retz.) Nees ex Steud. Syn. 1:264, 1854; GBCIP. 515, 1960; HFDD. 614, 1977.

Poa unioloides Retz. Observ. Bot. 5:19, 1789.

Eragrostis amabilis sensu Hook. f. FBI. 7:317 [non (Linn.) Wt. & Arn. 1838].

Annuals. **Culms** decumbent-ascending or erect. **Leaves** linear, with a rounded or subcordate base. **Spikelets** straw-coloured, often purple tinged, ovoid-oblong. **Glumes** subequal, linear-lanceolate, acute.

Found in cultivated fields.

Siddiqui 31152, Pihani Road.

29. **Dactyloctenium** Willd.

Dactyloctenium aegyptium (Linn.) P. Beauv. Ess. Agrost. 15, 1812; GBCIP. 489, 1960; HFDD. 599, 1977; FPP. 275, 1978.

Cynosurus aegyptius Linn. Sp. Pl. 72, 1753.

Eleusine aegyptia (Linn.) Desf. Fl. Atlant. 1:85, 1798; FBI. 7:295, 1896.

Annuals. **Culms** creeping and rooting below, ascending upwards, often prostrate; nodes glabrous. **Leaves** scabrid on the upper surface and margins. **Spikelets** accrescent upwards, 2-3 flowered. **Lower glume** acute with a ciliate winged keel, 1-nerved. **Upper glume** with awn.

A common grass of grass land and lawns.

Siddiqui 31155, Pihani Road.

30. **Desmostachya** Stapf

Desmostachya bipinnata (Linn.) Stapf Fl. Cap. 7:632, 1900; GBCIP. 491, 1960; HFDD. 600, 1977; FPP. 276, 1978.

Briza bipinnata Linn. Syst. Nat. ed. 10. 875, 1759.

Uniola bipinnata Linn. Sp. Pl. ed. 2. 104, 1762.

Poa cynosuroides Retz. Observ. Bot. 4:20, 1786.

Eragrostis cynosuroides (Retz.) P. Beauv. Ess. Agrost. 162, 1812; FBI. 7:324, 1896.

Perennials, with a thick rootstock. **Culms** erect; nodes glabrous. **Leaves** linear, narrowed into a filiform tip. **Spikelets** purple-brown, 2-seriate, 3-4 (-6) flowered. **Lower glume** keeled, mucronate, 1-nerved.

Not uncommon, found in waste lands, prefers sandy soils.

Siddiqui 31048, Etouli.

31. **Cloris** Sw.

Cloris dolichostachya Lagasca, Gen. Sp. Pl. 5, 1816; GBCIP. 466, 1960; HFDD. 593, 1977; FPP. 273, 1978.

Melica digitata Roxb. Fl. Ind. ed. Carey & Wall. 1:328, 1820.

Cloris incompleta Roth. Nov. Pl. Sp. 60, 1820.

Annual-perennial. **Culms** erect or decumbent-ascending; nodes glabrous. **Leaves** tappering towards the base. **Spikelets** imbricate. **Lower glume** acuminate, 1-nerved. **Upper glume** aristate, 1-nerved.

Common in agricultural fields.
Siddiqui 31067, Tanskhera.

32. **Cynodon** Rich. in Pers., nom. cons.

Cynodon dactylon (Linn.) Pers. Syn. Pl. 85, 1805; FBI. 7:288, 1896; GBCIP. 469, 1960; HFDD. 598, 1977; FPP. 275, 1978.

Panicum dactylon Linn. Sp. Pl. 58, 1753.

A very common throughout the area.
Siddiqui 31002, Hardoi.

33. **Avena** Linn.

Key to species:

All the lemnas with a thickened callus and densely bearded with golden hairs at the base.....1. *A. fatua*

Only the lowest lemnas with a thickened callus, lemnas glabrous except a few hairs at the base .....2. *A. sativa x sterilis*

1. **Avena fatus** Linn. Sp. Pl. 8Ø, 1753; GBCIP. 434, 196Ø; FPP. 271, 1978.

Often found in sandy soils.

Siddiqui 31144, Lucknow Road.

2. **Avena sativa x sterilis** GBCIP. 435, 196Ø; HFDD. 587, 1977; FPP. 271, 1978.

Annuals. **Culms** erect; nodes glabrous. **Leaves** linear-lanceolate, cordate, acuminate. scabrid. **Spikelets** pendant. **Glumes** 7-nerved.

Cultivated as food grains crop.

Siddiqui 31Ø71, Tanskhera.

34. **Arundo** Linn.

Arundo donax Linn. Sp. Pl. 81, 1753; GBCIP. 413, 196Ø; HFDD. 587, 1977.

Perennials, with a creeping rhizome. **Culms** stout; nodes glabrous. **Leaves** lanceolate, glabrous. **Spikelets** in plumose, decompound panicles, elliptic-lanceolate, pale-brown or purplish, 3-5 (-7) flowered. **Glumes** subequal, acuminate, 5-nerved, keeled, scabrid on the keel and marginal nerves.

Found along water courses.

Siddiqui 31154, Bhasenta.

35. **Hygroryza** Nees

Hygroryza aristata (Retz.) Nees ex Wight. & Arn. in Edinb. New Phil. J. 15:318, 1833; GBCIP. 597, 196Ø.

Pharus aristatus Retz. Obs. Bot. 5:23, 1789.

Leersia aristata (Retz.) Roxb. Fl. Ind. ed. 2. 2:207, 1832.

Zizania aristata (Retz.) Kunth. Rev. Gram. 1:8, 1829.

Zizania retzii Spreng. Syst. Veg. 2:136, 1825.

Potamochloa retzii Griff. in J. Asiat. Soc. Beng. 5:571, 1836, t. 24.

Found floating in ditches and ponds.
Siddiqui 31366, Hasia.

36. Oryza Linn.

Oryza sativa Linn. Sp. Pl. 333, 1753; GBCIP. 605, 1960; HFDD. 627, 1977.

Extensively cultivated in the area.
Siddiqui 31189, Hasia.

37. Phalaris Linn.

Phalaris minor Retz. Obs. Bot. 3:8, 1783; GBCIP. 616, 1960; FPP. 287, 1978.

Commonly found in wheat fields and on road sides.
Siddiqui 31162, Bhasenta.

38. Alopecurus Linn.

Alopecurus nepalensis Trin. ex Steud. Syn. 1:148, 1854; FBI. 7:239, 1896; GBCIP. 393, 1960; Raizada & Jain, Ind. For. 92:638, 1968; HFDD. 581, 1977; FPP. 269, 1978.

Annuals. Culms prostrate or decumbent-ascending; nodes glabrous. Leaves linear, acutely acuminate. Spikelets short pedicelled, ellipsoid. Glumes acute, 3-nerved.

Found in marshy places.

Siddiqui 31185, Majhola.

39. Polypogon Desf.

Polypogon monspeliensis (Linn.) Desf. Fl. Atlant. 1:67, 1798; FBI. 7:245, 1896, pro parte; GBCIP. 403, 1960; HFDD. 636, 1977; FPP. 288, 1978.

Alopecurus monspeliensis Linn. Sp. Pl. 61, 1753.

Annuals. **Culms** prostrate or decumbent-ascending; nodes glabrous. **Panicles** cylindrical, spiciform, often lobulate. **Spikelets** linear lanceolate. **Glumes** nearly equal, lanceolate, 2-toothed, with a scabrid awn.

Common in damp places.

Siddiqui 31054, Tanskhera.

40. Sporobolus R. Br.

Sporobolus diander (Retz.) P. Beauv. Ess. Agrost. 26:147, 178, 1812; FBI. 7:247, 1896; GBCIP. 629, 1960; HFDD. 647, 1977; FPP. 219, 1978.

Agrostis diandra Retz. Obs. Bot. 5:19, 1789.

Perennials. **Culms** erect, compressed; nodes glabrous. **Leaves** linear, narrowed towards the apex, often rolled. **Spikelets** more or less crowded, 1-flowered, ellipsoid-lanceolate, acute. **Lower glume** nerveless. **Upper glume** 1-nerved.

Found on saline soil and river beds.

Siddiqui 31071, Tanskhera.

41. **Perotis** W. Ait.

Perotis indica (Linn.) O. Kuntze, Rev. Gen. Pl. 2:787, 1891; GBCIP. 611, 1960; FPP. 287, 1978.

Anthoxanthum indicum Linn. Sp. Pl. 28, 1753.

Found on sandy soils.

Siddiqui 31074, Tanskhera.

42. **Triticum** Linn.

Triticum aestivum Linn. Sp. Pl. 85, 1753; GBCIP. 679, 1960; FPP. 291, 1978.

Triticum sativum Lamk. Fl. Franc. 3:625, 1778.

Triticum vulgare Vill. Hist. Pl. Daugh. 2:153, 1787.

Extensively cultivated in the area.

43. **Hordeum** Linn.

Hordeum vulgare Linn. Sp. Pl. 84, 1753; GBCIP. 677, 1960; FPP. 282, 1978.

Cultivated as grain crop.

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